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STEEL

For forty-eight years — IRON TRADE REVIEW

March 19, 1931

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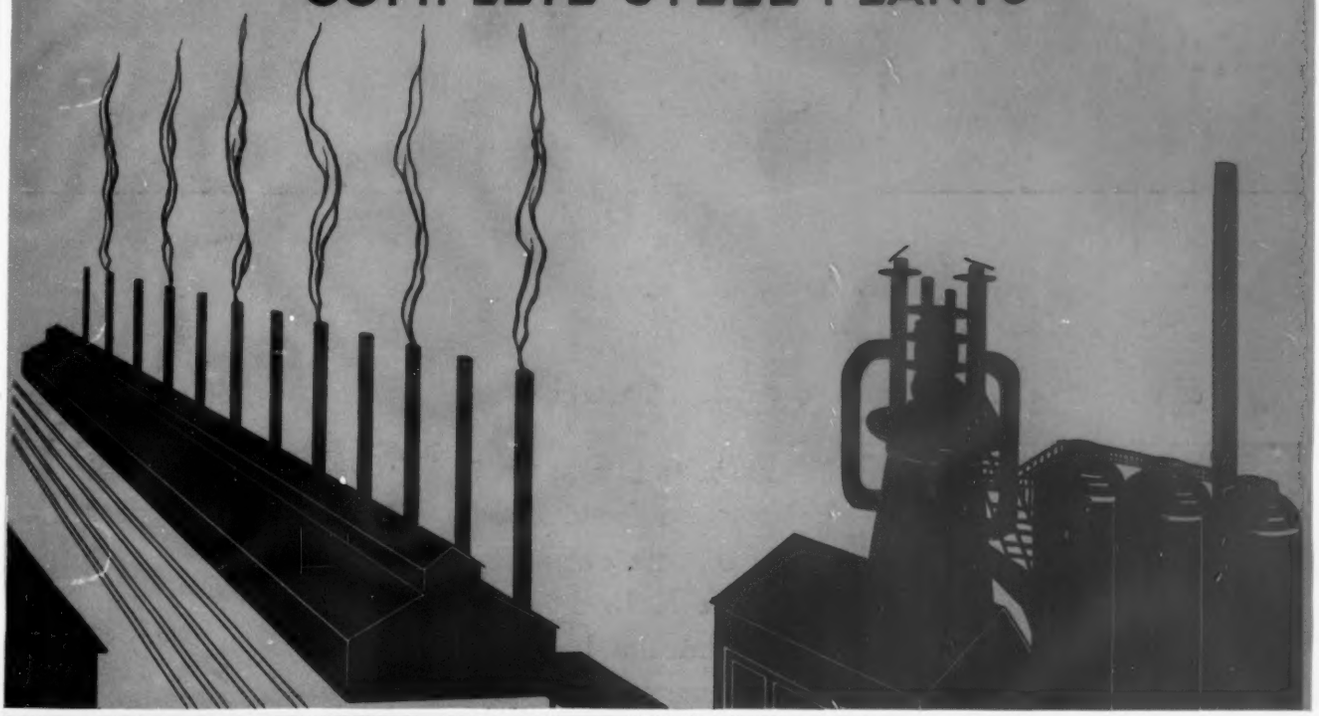

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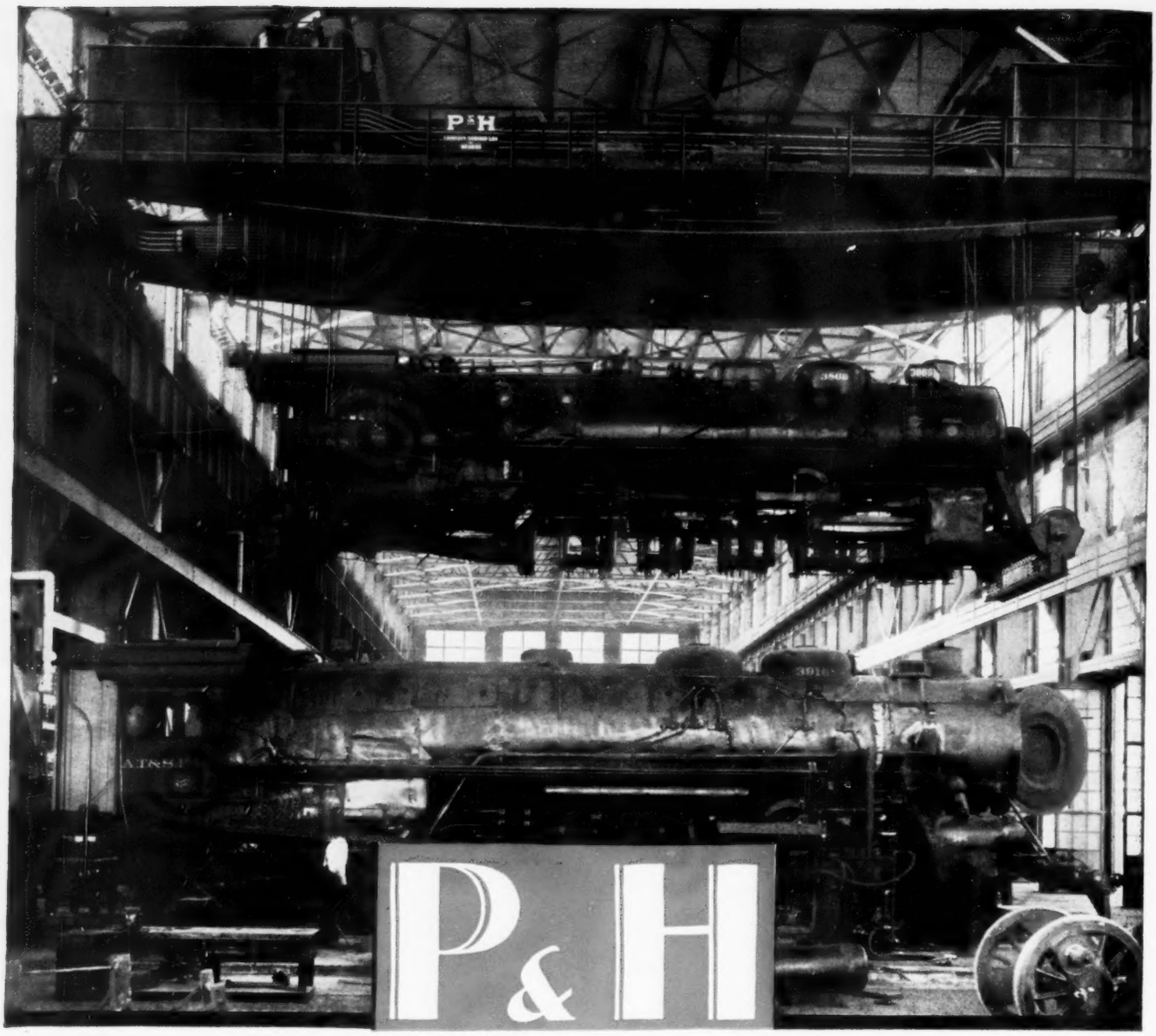

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CONTENTS

March 19, 1931

THIS WEEK IN STEEL 13

Russia's Iron and Steel Program a World Menace? 15
Ambitious Program Launched by Scrap Institute 17
Decree Clarifies Trade Association Functions 18
Corporation Profits in 1930 28.4 Per Cent Under 1929 19
Steel Corporation's Reduced Operations and Prices in 1930 20

Industrial Men in the Day's News 22
Obituary 23
Here and There in Industry 24
Mirrors of Motordom 25

EDITORIAL—Mechanical Burden Bearers of Industry 26
THE BUSINESS TREND 27

Seamless Chrome-Nickel Steel Tubes Find Diversified Uses 31
A Consulting Engineer Looks at Structural Welding 34
Scarfing Process Effective in Eliminating Defects 36
Physical Values Assist in Specifying Cold Strip—Part II 40
Deoxidizing Agent Makes Uniformly Clean Steel 46
Hardness and Crystal Structure of Nitrided Steels Linked 51
Large Uses of Steel in Small Ways—Pressure Gages 54
Scanning the Technology of Steel 55
Machine Tools and Plant Equipment 57

MARKET SUMMARY 69
MARKET REPORTS AND PRICES 70-100
CONSTRUCTION AND ENTERPRISE 103
NEW TRADE PUBLICATIONS 108
WHERE-TO-BUY DEPARTMENT 111
ADVERTISERS' INDEX 140

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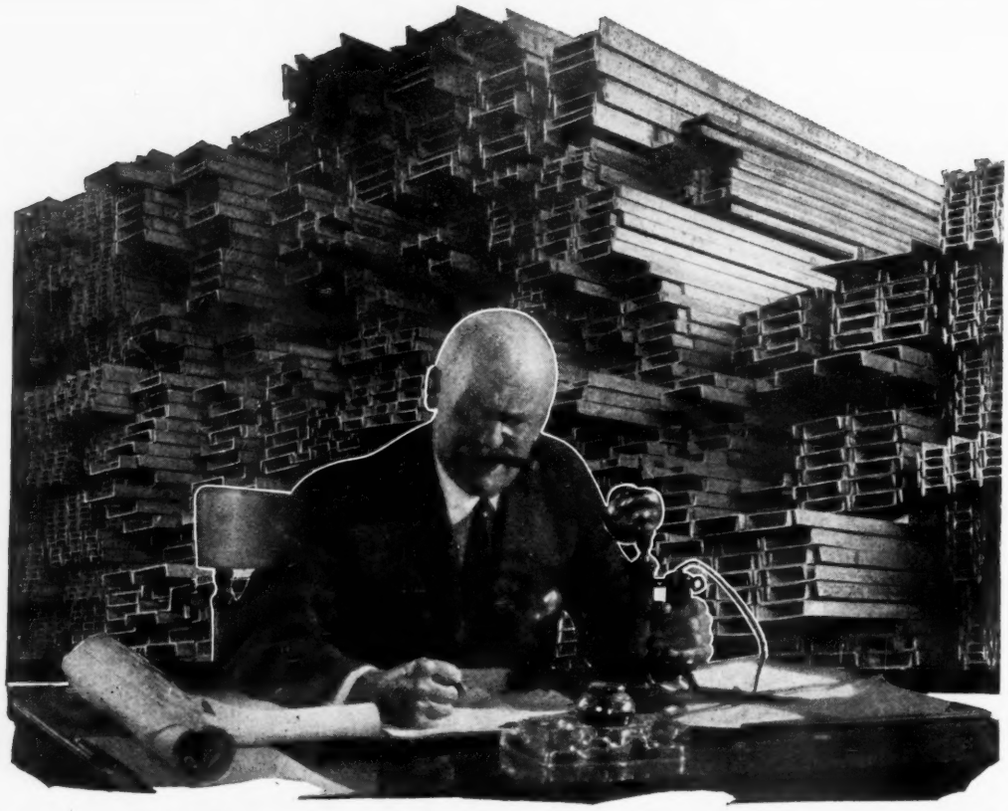

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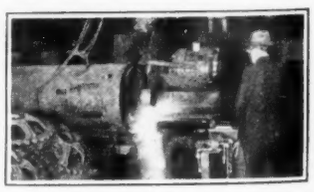


Volume 89 Number 12

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

IS THE Russian bear of the tractable brown variety or a ferocious grizzly? For more than a decade world governments have been seeking the answer in politics; now business is on the *qui vive* as the soviet's 5-year program of industrial expansion appears to be making notable progress. From trustworthy soviet sources come these salient facts (Page 15) concerning the 5-year program in iron and steel:

In 1930, second year of the program, Russian output of pig iron was 5,000,000 tons and of steel ingots 5,500,000 tons—roughly one-seventh that of the United States. The goal for 1933, on completion of the program, is 17,000,000 tons of pig iron and 21,000,000 tons of steel, or 238 pounds of iron and 295 pounds of steel for each member of the proletariat.

Soviet authorities ask, accordingly, will a a total output in 1933 equalling that of the United States in 1905 and a per capita production measuring up with the United States of four decades ago menace the capitalistic world? Especially when internal requirements will consume all of this metal except possible minor exports to the soviet's far-eastern neighbors?

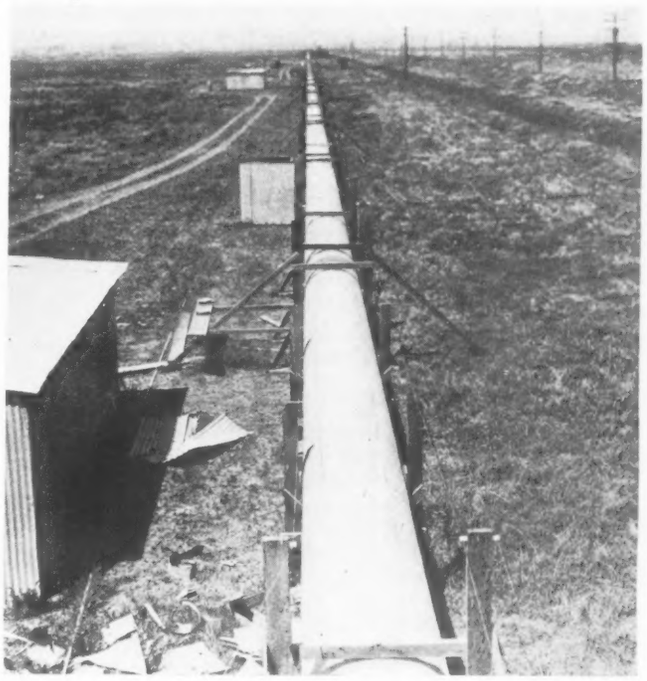
From blast furnace to profits, the rehabilitated Russian industry is being standardized. There is but one producer and one consumer—the government. An American engineer who believes the Russian bear tame enough to stroke points out (Page 16) that Russian plants are being located at strategic points for domestic development. Red or not, the Russian situation commands increasing attention.

Embargoes Now an International Fashion

Rumors of Russian recognition are current again in Washington, but seem to have no more foundation than the fact the state department is to study soviet policies more intensively. . . . In an attempt to find a flaw in the treasury department's embargo on Russian lumber, similar to the one domestic producers of manganese sought on soviet ore, Moscow is dispatching (Page 18) a test cargo to Providence . . . . Noting that international embargoes are the fashion, Brazil has prohibited imports of industrial machinery (Page 18) until March, 1934. . . . And Canada, which only a few months ago erected a tariff wall, is already considering (Page 18) a top addition.

"Detroit-Plus" Goes on Disassembly Line

F.o.b. Detroit is almost as inseparable from the automobile industry as its January shows. Whether purchased in New York or San Francisco and assembled from parts made locally or shipped knocked-down from Detroit, Henry Ford has always applied an f.o.b. Detroit price. Now, it is reliably reported (Page 25) at Detroit, he proposes to pass along his freight advantage to his customers establishing one



Acme-P. & A. Photo

Nothing but light will be sent through this mile-long sheet steel vacuum tube. Dr. Albert A. Michelson, Chicago scientist, will seek to determine accurately the speed of light by means of mirrors in the tube

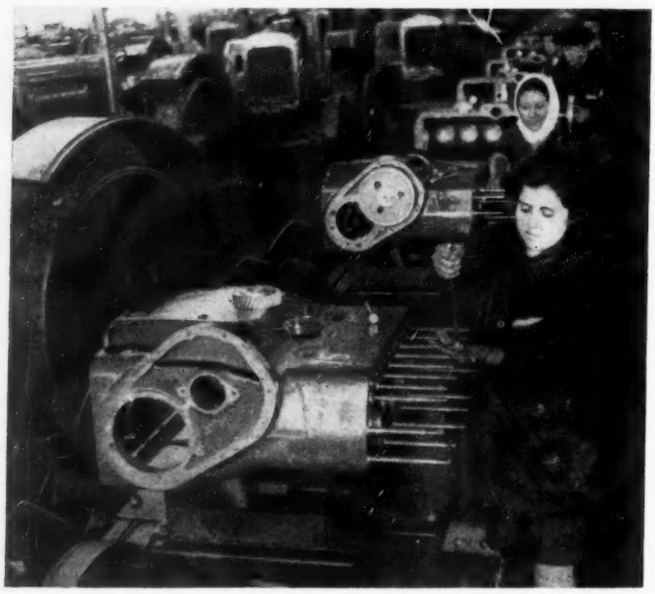
standard price based upon the nearest assembly point. . . . The automobile industry, which is distinctly looking up, expects shortly (Page 64) to pass upon alloy steels having stainless and rustproofing qualities veneered or built into them.

Illegal Collectively, Legal Individually

One of those amicable agreements termed a consent decree ends the action of the department of justice against the Bolt, Nut and Rivet Manufacturers' association (Page 18) and clarifies the province both of individuals and trade association. . . . By unanimous consent the steel industry is forgetting 1930 as quickly as possible. The pamphlet report of the United States Steel Corp. discloses 1930 (Page 21) as the lowest year since 1921 in tonnage, employes and profits. But due to several absorptions, capital expenditures were at a record high. . . . . A firm of national accountants, after surveying 1432 corporations, including 972 industrials, reports (Page 19) that corporation profits in 1930 declined 28.4 per cent from 1929. . . . Some of this shrinkage in profits is traceable to maintenance of abnormal labor forces to alleviate unemployment, as by steel barrel manufacturers (Page 18) for example.

Scrap Industry Knows Its Costs

No longer does a scrap dealer reckon he has made a profit when he concludes the year with more money in the bank than at the beginning. For an industry so personal and so highly competitive, costs were discussed with unusual frankness (Page 66) at the recent convention of the Institute of Scrap Iron and Steel. . . . Important planks in a 5-year program adopted (Page 17) by the scrap institute are mergers, a cost manual, elimination of direct trading, advertising, exports and a distribution survey. . . . Less semifinished steel is finding its way to the scrap yard as a result of a new method—scarfing—now employed (Page 36) to remove surface defects such as seams, scabs, blisters.



Courtesy Economic Review of Soviet Union

Assembling motors for tractors for collective farms at the Stalingrad tractor plant, Russia

Structural Steel Has Size Complex

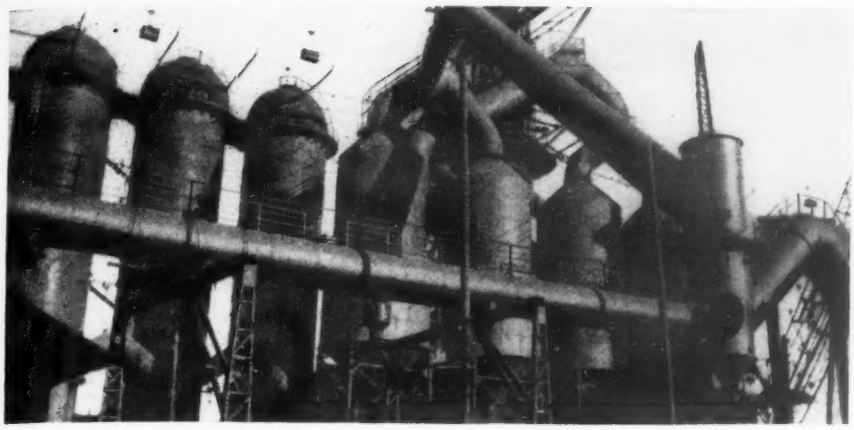
Probably the largest structural job ever placed, the 125,000 tons of steel for the Rockefeller "radio city" in New York will be supplied by the United States Steel Corp. (Page 74). . . . The Pennsylvania railroad will know next Monday what 100,000 tons of steel, chiefly for its electrification program (Page 74), costs. . . . A $50,000,000 contract for building Hoover dam, requiring over 100,000 tons of steel (Page 90), has been awarded. . . . As the momentum acquired in January and February is dissipated, the steel markets become more irregular. Operations, however, are up one point this week, to 57 per cent (Page 84). . . . Steelmakers are standing more firmly on their advances for the second quarter (Page 69). . . . British steel users, sensing the approach of a tariff, are buying (Page 96) more steel on the Continent.

Claims Money Rates a Sure Barometer

Money rates are a sure indicator of the course of business; their changes have forerun every important depression and boom in 50 years, declares (Page 19) a New England manufacturer-economist. At present, improvement in business is forecast. . . . Would the theory stand the rigors to which a 4,000,000-pound hydraulic testing machine will put (Page 18) material for the Hoover dam? . . . . Still other testing machines are employed by the metallurgist for determining the physical qualities of cold-rolled strip steel (Page 40) and aiding the purchaser. . . . Speaking of pressure, the annual production of pressure gages for automobiles approaches 5,000,000 units (Page 54) using 2500 tons of steel annually.

Alloy Steels Conquer New Fields

Judging by the increasing list of users of chrome-nickel seamless tubing industry is becoming more aggressive in its war on heat, acids and corrosion. In the manufacture of this tubing (Page 31) by piercing a heated billet and rolling down the wall thickness on a mandrel, extreme care is taken to insure a uniform, high-quality product. . . . Cleaner steel and more rapid deoxidation are claimed as the benefits from using a new alloy (Page 46) of 7 to 8 per cent silicon and 25 to 30 per cent manganese as a deoxidizing agent. . . . A speaker at the recent Western Metal congress at San Francisco related details (Page 51) of a research in which correlation of the crystal structure and hardness of nitride steels at different depths of the case was made.



Russia—Her Iron and Steel Program a World Menace?

ON COMPLETION of her 5-year plan in 1933 Russia will have the capacity for producing annually 17,000,000 tons of pig iron, 21,000,000 tons of steel ingots and 17,500,000 tons of finished rolled steel—provided, of course, she prosecutes the remainder of her plan with the energy currently displayed.

For Russia this means the virtual quadrupling in three years of her production of these products in the year ended last October, which, incidentally, had just caught up with the prewar year 1913.

By comparison, the United States in 1929—the greatest industrial year in its history—produced 42,270,183 tons of pig iron and 54,312,279 tons of steel ingots. In the lean year 1930 its output of pig iron was 31,441,488 tons and of steel ingots 39,652,539 tons.

Still another comparison: With an estimated population of about 160,000,000 persons in 1933, Russia will have a per capita output of about 238 pounds of pig iron and 295 pounds of steel ingots. In 1930 the production per capita in the United States was 586 pounds of pig iron and 754 pounds of steel. Thus, when Russia in 1933 completes the rehabilitation of her iron and steel industry she will be approximately at the point in total production where the United States was in 1905, and in point of per capita production where the United States was in the 1890's!

The Facts About Russia

RUSSIA and her 5-year iron and steel expansion plan are big news. Will the soviet, having drawn upon the rest of the world, principally the United States, for technical assistance and equipment, prove to be a dangerous competitor in world markets?

Herewith the editors of STEEL *set forth the salient facts concerning Russia, letting readers draw their own conclusions, from interviews with two men who know Russia intimately: Maurice Mendelson, director of publicity, Amtorg Trading Corp., New York, and H. J. Freyn, president, Freyn Engineering Co., Chicago.*

Russia, according to Maurice Mendelson, director of publicity for the Amtorg Trading Corp., New York, which is buying equipment for Russia, will have need internally for all the steel she can produce under the 5-year program, and even more. At present, certain European steel-producing nations are conducting negotiations for supplying some of the soviet government's urgent immediate requirements for steel.

Ultimately it is expected that Russia will export some steel to nearby countries which lack their own production, such as Persia and the small states to the south and southeast, but "anything in the way of an extended exportation of steel and steel products by Russia for years to come appears remote."

States Mr. Mendelson:

"Indicative of the channels into which much of Russia's iron and steel will flow are numerous textile, machine tool, agricultural equipment and other machinery plants. The construction of machinery plants has already exceeded the 5-year program. Under way are ten large agricultural implement plants, of which four are to be devoted to the production of tractors.

Plan 140,000 Fords Annually

"Three large automobile plants are under construction, including one at Nizhni Novgorod which will produce annually 140,000 cars of the Ford type. Many types of heavy machinery not produced in Russia before the war are now being made.

"The output of the industrial machine-building industry in 1929-30 totaled 1,100,000,000 rubles ($550,000,000), while the program for 1931 calls for a production valued at 2,500,000,000 rubles. (Ruble=50c.)

"An indication of the great volume of industrial construction under way is given by the figures for capital investments in large-scale industry, which were 3,200,000,000 rubles in 1929-30 and are scheduled at 5,500,000,000 rubles this year.

"Aside from the industries men-

Where 5-Year Program Will Lead Russia in Iron and Steel

Production in thousands of metric tons—Bracketed years are October to October

	1913	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30	1931 (Program)	1932 (Orig. 5-yr. plan)	1933 (Revised 5-yr. plan)
Iron ore	9,210.0	948.0	2,132.8	3,306.5	4,816.7	6,030.1	7,120.0	10,250.3	16,100.0	.....	.....
Coke	.....	.....	.....	.....	3,415.0	4,041.0	4,715.0	6,000.0	.....	.....	.....
Pig iron	4,206.5	660.5	1,289.0	2,194.0	2,965.0	3,274.0	4,017.8	4,969.5	8,000.0	12,000.0	17,000.0
Steel ingots	4,245.8	992.7	1,868.3	2,910.9	3,591.6	4,166.0	4,722.6	5,553.6	9,500.0	14,500.0	21,000.0
Rolled steel	3,509.0	689.7	1,390.2	2,249.5	2,724.5	3,224.1	3,691.6	4,478.4	6,500.0	11,000.0	17,500.0
No of units in operation											
Blast furnaces	68	36	45	50	54	62	70	77	.....	.....	.....
Open-hearth steel furnaces	.....	115	152	106	175	185	.....	.....	.....	.....	.....

tioned before extensive development programs are being carried out in the coal, oil, chemical, food, electrotechnical and other industries, all of which will require great quantities of metal products.

"Extensive housing programs, many calling for apartments of modern design, are to furnish important outlets for steel. More than 15,000 miles of railroad track is to be laid under the 5-year program, and this, it is to be borne in mind, is to be the basis for further development.

"Construction of more than 40 central power plants, including several hydroelectric projects, not only gives evidence of Russia's growing industrial and social needs, but in itself gives promise of further demand for various forms of steel.

"After the present 5-year plan is completed other long-range programs will undoubtely be embarked on, and these will probably be even more ambitious than the present one.

"When it is kept in mind that the per capita national income in the U. S. S. R. is only about one seventh that of the United States it can be seen that the energies of the soviet union will for many years to come have to be concentrated on its task of raising the standard of living of the population.

Problem of Labor Important

"Moreover, there is the important consideration of the training of skilled workmen. So rapid has been the development of her iron and steel and machinery industries that Russia has had to draw upon men from many walks of life, particularly farmers. To train and organize them in the ways of modern industry will require considerable time, notwithstanding the work of various trade schools that have been recently established by the soviet."

H. J. Freyn, Chicago, president of the Freyn Engineering Co., whose engineers have been in Russia for several years helping to develop coal, iron and steel properties, states:

"Alarm is felt in iron and steel producing countries concerning the possibility of the soviet union becoming a dangerous competitor in the world's markets for iron and steel products after the completion of the 5-year plan. These apprehensions are groundless.

"The industrial, agricultural and transportation development of the soviet union during and after the present 5-year plan will for many years to come require for home consumption every ton of pig iron, steel and rolled products produced.

"The geographical locations of the largest plants under construction were chosen not only on account of the raw materials available, but as strategic centers for the industrial

H. J. Freyn

development of the regions in which these plants are located.

"Furthermore, the great distances of these plants from shipping ports, high costs and quality of product will militate against exports.

"An interesting sidelight on this question is presented by a comparison of the per capita production of pig iron and ingots in the United States and in soviet union.

"The figures for the United States were taken from the Jan. 1, 1931, issue of STEEL, and those for the soviet union were prepared on the basis of an estimated population of 150,000,000 inhabitants in 1930, considering the annual percentage increase of approximately 2.3 per cent.

"The product of the iron and steel industry is sold by a central selling organization at prices fixed by the government. Profits are the difference between standard selling prices and manufacturing costs, plus fixed charges, taxes and amortization. Profits are split about 50-50 between the state treasury and the combine or plant realizing them.

"A distinct advantage of state control in the soviet iron and steel industry is the facility for standardization. Unlike other industrial countries, the soviet system can and does provide for all steel plants in the union, standard blast furnaces, standard open-hearth and bessemer plants, standard rolling mills, as well as standard auxiliary equipment of every character."

New integrated iron and steel plants contemplated or in course of construction, with their annual pig iron capacity in 1933 are named as follows by Soviet authorities:

	Tons
Magnitogorsk (Urals)	2,500,000
Kuznetsk (Siberia)	1,200,000
Dnieprostal (Ukraine)	1,200,000
Nizhni Tagil (Urals)	1,200,000
Lipetsk (Central Region)	1,200,000
Bakal (Urals)	1,200,000
Mariupol (South)	1,000,000
Total	9,500,000

Plants in course of reconstruction, with their annual capacity in 1933, are:

	Tons
Tomski (Makeevka)	1,400,000
Dzherzhinsky (Kamenskoie)	1,560,000
Voroshilov (Don Bas)	1,100,000
Total	4,060,000

There are 39 existing iron and steel plants in Russia whose reconstruction by 1933 will complete the 17,000,000 tons of proposed pig iron capacity.

One-Seventh for Steel

One-seventh of all capital expenditures in Russia in 1929-30 was for expansion of the iron and steel industry, this totaling more than 500,000,000 rubles. Of this amount, 33.5 per cent was for expansion and reconstruction of old plants, 28.5 per cent was for new construction and the remainder for safety measures, housing and similar outlays.

An estimate of the iron ore reserves, exclusive of Kursk magnetic deposits, is 3,000,000,000 metric tons.

For the present, the soviet government itself will be practically the only buyer of iron and steel because of the state ownership of all industry.

All railroads are nationalized, and much finishing mill capacity will be devoted to rails and bridge material, in the near future. The automobile and tractor plants, to be large consumers of steel, also are state-owned.

Russian statistics are in metric tons of 2204 pounds; United States in gross tons of 2240 pounds.

Per Capita Production of Iron, Steel Compared

Pounds

UNITED STATES

	Pig iron	Ingots
1880	171	55
1890	327	152
1900	406	300
1910	663	634
1920	777	887
1925	713	881
1926	752	924
1927	691	848
1928	712	962
1929	786	1,040
1930	586	754

RUSSIA

	Pig iron	Ingots
1926-27 (Fiscal Year)	48	58
1927-28 (Fiscal Year)	51	65
1928-29 (Fiscal Year)	61	72
1929-30 (Fiscal Year)	75	83
1931 (Plan)	117	139
1932 (Plan)	172	204
1933 (Plan)	238	295

Ambitious Program Launched by Scrap Institute

TAKING courage from the progress attained in the three years of its existence, the Institute of Scrap Iron and Steel Inc. closed its third annual convention at Cleveland March 12 by adoption of a plan for stabilization of the industry over the next five years.

So much has been accomplished in providing a foundation that members of the institute feel justified in proceeding to more ambitious efforts to bring about a condition befitting the importance of this branch of industry to industry as a whole. The statement of this five-year plan was presented by the director general, Benjamin Schwartz, in an address which created great enthusiasm. The eight recommendations which will serve as a working basis are presented on page 66.

At the banquet, which closed the sessions, the committee in charge of the institute award, a bronze medal for the person contributing the greatest service in advancing the best and largest interest of the industry, presented it to Mr. Schwartz.

In setting forth the plan for future accomplishment Mr. Schwartz revealed that adverse conditions within the organization have not been eliminated and that difficulties are being met in placing it on the highest levels.

"There are those who have come into the institute with their fingers crossed, their tongues in their cheeks and who are always setting personal standards by which to justify their membership in the institute," he said.

"There are those who scatter like rats at the first 'boo' whispered by some outside interest. They tell me when a scrap dealer does that, he is simply preserving his bread and butter. How bitter that bread must be which is not earned and does not have self respect with it!

"Neither the institute nor an industry can be built on such shifting foundations. We want that type of member off our necks. We want to know that we are surrounded by men who desire to stay in this business, who wish to make it profitable and respectable and whose vision extends beyond the narrow confines of their villages."

To this class of members he threw down the gauntlet and challenged to combat in the interests of the best class of the membership. Of measureable values accruing to the membership he estimates that the institute during the past year has actually saved $1,000,000 through the arbitration, trade relations, traffic, legislation, credit bureau and other services.

One of the most important features of the sessions was the attention given to costs and their determination. Willingness of yard owners to give their actual cost figures went beyond expectations and

(*Concluded on Page* 66)

New Institute Officers

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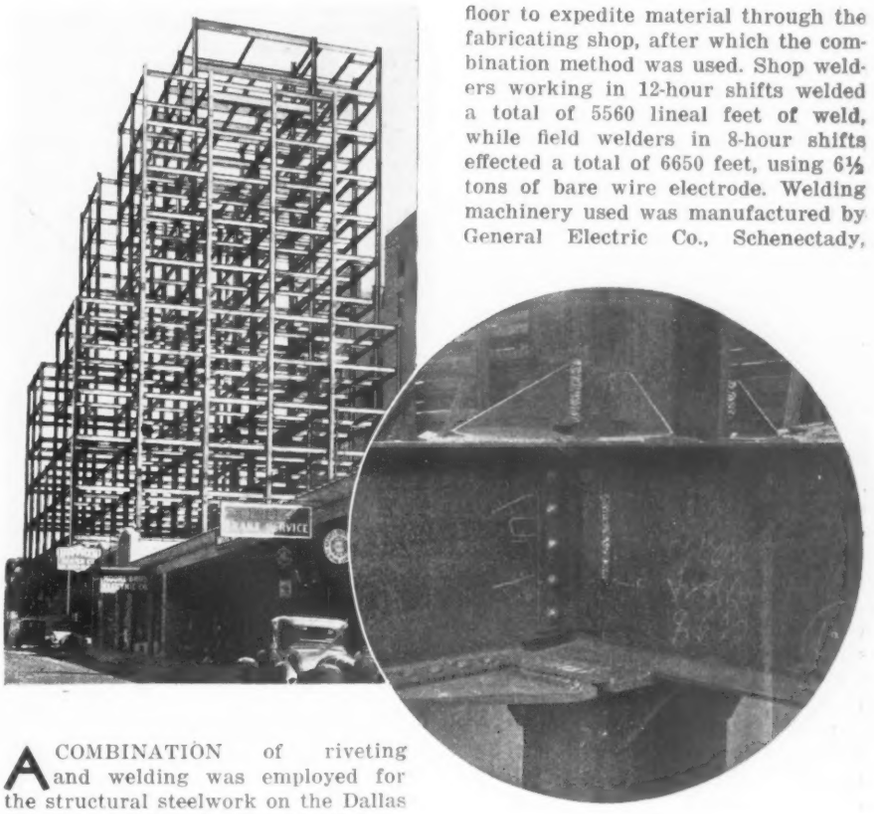
Thomas F. Kelly, Brooklyn, N. Y.

Executive Committee — Chairman, Phil W. Frieder, Youngstown, O.; Michael V. Bonomo, Jersey City, N. J.; George B. Doane, Boston; William M. Hilb, Cincinnati; Darwin S. Luntz, Canton, O.; Ike Wilkoff, Youngstown, O.; and the officers.

Directors, for three years—Myron A. Cohen, Cleveland; M. Davidson, Stockton, Calif.; Jack R. Forcheimer, St. Louis; Abraham Isaac, Elizabeth, N. J.; Thomas F. Kelly, Brooklyn, N. Y.; Darwin S. Luntz, Canton, O.; Morris Schapiro, Baltimore; Harry Silverstein, Charleston, W. Va.; David Strauss, New York.

Welding, Riveting Combined in Structure



A COMBINATION of riveting and welding was employed for the structural steelwork on the Dallas Gas Co.'s building, Dallas, Tex. Framework recently was completed for 14 floors, though the building is designed for 22 stories, the greatest height of any building in the South in which arc welding was specified.

To save time a combination of about 70 per cent shop welding and 30 per cent shop riveting was employed. The structure was all-welded to the sixth floor to expedite material through the fabricating shop, after which the combination method was used. Shop welders working in 12-hour shifts welded a total of 5560 lineal feet of weld, while field welders in 8-hour shifts effected a total of 6650 feet, using 6½ tons of bare wire electrode. Welding machinery used was manufactured by General Electric Co., Schenectady, N. Y., and Lincoln Electric Co., Cleveland.

The building required 1000 tons of structural steel, fabricated and erected by Austin Bros., Dallas. Engineering work on the building was by Gardner & Howe, Dallas. The circular illustration is an example of the combination field welding and riveting

Consent Decree Clarifies Trade Association Functions

DISCONTINUANCE of certain practices of the Bolt, Nut and Rivet Manufacturers association is directed in a consent decree of far-reaching importance to all trade associations, handed down March 17 in the district court of the United States for the southern district of New York.

This decision, the result of an extended period of litigation between the department of justice and the association, defines what are considered illegal actions on the part of the group as a whole, and has been awaited with a great deal of interest.

Being the first instance wherein the operation of an association has been the subject for a opinion on the part of the government, the decree is regarded as setting up a pattern for the guidance of the activities of other trade bodies.

Present Group To Be Dissolved

The ruling levies no penalties for past actions of the Bolt, Nut and Rivet Manufacturers association. It provides for the dissolution of the present association within 90 days after its entry, but permits the formation of another association. Practices objected to are declared to be illegal only when members of the association engage in them as a group, not when carried on individually. These practices include, among others, the concerted fixing of prices, discounts, arbitrary freight charges, etc.; the prevailing by one individual upon another to refrain from quoting higher or lower prices; the concerted establishment of certain basing points to the exclusion of others; the circulation of a list defining wholesale distributors and large consumers of bolts and nuts in the United States who are entitled to purchase these products direct from the manufacturers; and the concerted arriving at or use of a list of preferred or nonpreferred purchasers of bolts, nuts and rivets.

It will be noted in these and other restraints included in the decree that the government bases its objections to certain practices because they are engaged in concertedly, but it is specifically stated that this is not to be construed to include merely simultaneous or similar action independently taken on the part of two or more individual companies.

Any manufacturer, therefore, is free to prepare its own list of wholesale distributors and large consumers entitled to buy from it and to use such a list of customers, although any unlawful discrimination in price against a purchaser or class of purchasers of bolts, nuts and rivets naturally is prohibited.

This decree is regarded with satisfaction by bolt, nut and rivet manufacturers inasmuch as it clears up the uncertainty under which the industry has operated for some time. A statement by Charles J. Graham, president of the association follows:

"Throughout the past year, the Bolt, Nut and Rivet Manufacturers association has been engaged in conferences with the department of justice in respect to the legality of a portion of its plan of operation.

"In order to bring all of its operations in line with the present policy of the department, it has finally agreed to the entry of a consent decree which forbids concerted action among its members in regard to some features of its activities. The decree also provides for the dissolution of the present association within 90 days after its entry, but specifically reserves to the defendants the right to form another association.

Expensive Litigation Prevented

"By this disposition of the matter, the industry avoids the expense and annoyance of a long and costly litigation. Immediate steps will be taken to organize a new association which will so operate as to be free from any criticism on the part of the government.

"Final disposition of this case by agreement, on the basis described, is very satisfactory to the manufacturers."

Defendants in the case included 48 companies, embracing practically all producers, the association and three individuals.

Steel Barrel Makers Holding Labor Personnel

Washington — Members of the Steel Barrel Manufacturers institute, Cleveland, account for about 70 per cent of the country's output of steel barrels, and at present they are employing approximately 80 per cent of the wage earners and salaried personnel used in this industry last year, on a part time basis. This is stated in a report by D. S. Hunter, secretary-treasurer of the institute, to Col. Arthur Woods, chairman of the President's emergency committee for employment.

"While our production declined only 18 per cent in 1930 as compared to 1929, it has dropped 40 per cent the first two months of 1931, compared with 1930," says Mr. Hunter. "Our practices have held employment to a higher level than had we cut proportionately to the decline in production."

The Business Week In Washington

BRAZIL has prohibited for three years beginning March 12 the importation of industrial machinery excepting on special license obtained from the minister of labor and commerce. In 1929, the latest year for which statistics are available, the United States shipped $6,362,846 worth of such machinery to Brazil. The decree does not affect orders placed before March 7.

□ □ □

Further revision of the Canadian tariff, indicated at Ottawa, Ont., March 12 when the dominion parliament convened, is being watched carefully by government authorities.

□ □ □

The contract let last week for part of the Hoover dam project to Six Companies Inc., San Francisco, for $48,890,995 was the largest ever let by the federal government.

□ □ □

The soviet government is shipping a cargo of lumber to Providence, R. I., to test the recent treasury department decision that importers of products suspected made by convict labor must produce proof to the contrary.

□ □ □

Because conditions change and future needs cannot be anticipated, no practical advance arrangements can be made for fixing wartime prices, Newton D. Baker, former secretary of war, told the war policies committee. Rear Admiral Samuel McGowan, retired, wartime paymaster general of the navy, favors the plan of Bernard Baruch of "freezing" prices immediately war is declared.

4,000,000-Pound Testing Machine of Record Size

A 4,000,000-pound hydraulic testing machine has just been completed at the Eddystone plant of the Southwark Foundry & Machine Co., Eddystone, Pa. This is the largest machine of this character which the Southwark company has ever built and few machines anywhere in the world exceed its capacity. Intended for use in testing materials for the Hoover dam in Colorado, it

will be set up in the Denver laboratory of the bureau of standards.

The machine complete as set up and tested in the manufacturer's plant weighs 175,000 pounds and has a 56-inch ram and cylinder. It is of the inverted hydraulic type with the table above the cylinder and the ram working downward, pulling the overhead yoke and weighing mechanism on to the specimen under test. Capacity is for 6-foot columns in compression and operation is with oil under 2500 pounds per square inch pressure.

Is Licensed by Nitralloy

New York—Bethlehem Steel Co., Bethlehem, Pa., has obtained a license to produce alloy steel under patents of the Nitralloy Corp., 52 Broadway. Other steel-producing licensees of the Nitralloy Corp. in this country are: Ludlum Steel Co., Watervliet, N. Y.; Crucible Steel Co. of America, New York; Firth-Sterling Steel Co., Pittsburgh; Vanadium Steel Alloy Co., Pittsburgh; and the Republic Steel Corp., Youngstown, O.

Disband Steel House Co.

Steel Frame House Co., subsidiary of the former McClintic-Marshall Corp., Pittsburgh, which is now the McClintic-Marshall Corp., Bethlehem, Pa., a subsidiary of the Bethlehem Steel Corp., has been disbanded and some of the former employes over the country ordered to return to the home office. The Steel Frame House Co. specialized in framework of steel for private residences.

President for Republic?

Cleveland—Election of a president of the Republic Steel Corp., Cleveland and Youngstown, O., at the annual meeting April 8 at Jersey City, N. J., is a possibility. Since the death of Elmer T. McCleary last year Tom M. Girdler has been serving as chairman and president.

Corporation Profits in 1930 28.4 Per Cent Under 1929

AGGREGATE profits of 1432 corporations in 1930 were 28.49 per cent less than in 1929, according to a compilation by Ernst & Ernst, accountants, New York. The list includes 972 industrials, 171 railroads, 103 telephone companies, 95 other public utilities and 91 financial institutions, embracing practically all of the leading corporations whose net earnings for 1930 have been reported.

For the 972 industrials, in more than 30 lines, the compilation shows that net profits for 1930 were in the aggregate 39.73 per cent less than for 1929. Two groups show greater profits: Amusement companies and drugs. Of the 972 individual companies, 188 show better results and 784 poorer results, comparing 1930 with 1929.

Net operating income for the 171 railroads in 1930 was 30.57 per cent lower than in 1929. Operating income of the 103 telephone companies for 11 months was off 2.09 per cent, but profits of the 95 other public utilities for 11 months were 1.90 per cent better.

The group of 91 financial institutions, including banks, investment trusts and others, showed net earnings for 1930 were 52.88 per cent lower than for 1929.

Aggregate net profits of 886 industrial corporations in 1930 were 28.68 per cent lower than in 1928 and 39.67 per cent less than in 1929.

Further comparison shows that earnings of 782 industrials for 1930 were in the aggregate 40.38 per cent under 1929, 29.67 per cent below 1928, and 16.63 per cent less than in 1927.

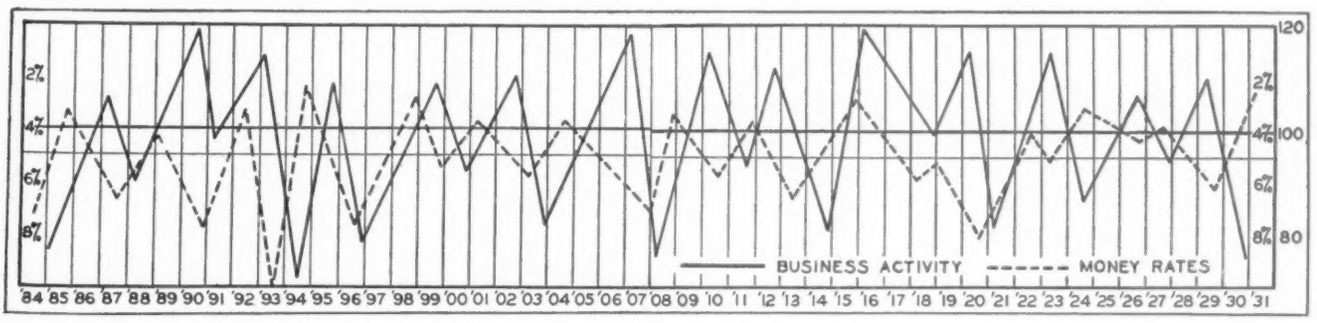
Decrease in Industrial Profits in 1930

	Per Cent Under	
	1929	1928
Aeronautics	74.48	69.77
Amusement Cos.	1.91*	97.10*
Automobile mfrs.	50.07	55.76
Auto parts, accessories	66.22	64.34
Bakeries	7.69	4.99*
Beverages, confections	2.47	21.00*
Brass, copper products	75.48	72.79
Building materials, equip.	31.95	23.55
Business equipment	41.63	7.42
Chemicals	30.50	12.34
Clothing mfrs.	67.24	66.12
Drugs	7.01*	25.56*
Elect. household equip.	48.97	8.56
Food products—misc.	17.64	4.80
Iron, steel	51.17	16.18
Machinery, tools	40.38	23.35
Meat packers	16.61	21.15
Merchandising	42.98	43.00
Metal products—sundry	40.70	25.07
Mining, smelting	65.29	54.14
Oil prod. and refining	32.06	21.27
Paper products	49.13	36.48
Printers, publishers	15.17	2.85
Railroad equipment	19.92	33.69*
Restaurant chains	10.47	11.87*
Rubber Cos.	103.86	105.27
Shoe mfrs.	31.30	28.40
Sugar Cos.	170.79	128.77
Textiles	339.00	321.88
Tobacco products	4.20	2.92*
Unclassified	29.64	16.25

*Increases.

Barge Canal Opens April 6

New York state barge canal will open between Buffalo and New York, and between Oswego and New York, April 6, the earliest date in 100 years of recorded history of this waterway.



DURING the past 50 years major swings in money rates have forecast accurately, months in advance, every major swing in business activity, declares Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass., and John G. Thompson, his assistant. Sales planning, production planning and budgeting could have been based upon these forecasts without a single error in the 14 upward swings, including the boom of 1929, and the 14 downward swings, including the depression of 1930, it is claimed. In the above chart is depicted the course of business activity from 1884 to date, it being observed that money rates forecast an upswing this year. The broken line represents money rates, being based upon commercial paper rates at New York. The solid line represents business activity, based upon data from The Annalist

Corporation Shows Reduced Output and Prices for 1930

PRODUCTION of rolled and other finished products for sale by the United States Steel Corp. in 1930 averaged 65.6 per cent of capacity, compared with 89.2 per cent in 1929, according to the corporation's annual pamphlet report just issued. The ratio of output to capacity in 1930 was next to the lowest for any year since the organization of the corporation, the lowest having been in 1921, when the ratio was 47.5 per cent.

Marked recession in demand for products of the subsidiary companies which developed in the fall of 1929 continued during the first half of 1930, and in the last half the decline became further pronounced, the output in the last quarter equalling only 47.9 per cent of capacity.

Continued reduction in demand during the year was accompanied by a substantial decline in prices obtained. As a result the average selling price received for the total tonnage of rolled and other finished products shipped in 1930, compared with prices received in 1929 for an equal tonnage of similar products, was $3.61 per ton less for domestic, and $2.03 per ton less for export shipments.

These decreases in prices account for a reduction of approximately $40,600,000 of the total reduction of $108,128,701 in the net earnings realized in 1930, compared with those for 1929.

The total value of business transacted by all subsidiary companies during 1930, as represented by their combined gross sales and earnings, amounted to $1,180,934,971, compared with $1,509,584,637 in the preceding year.

Expenditures made during 1930 for general maintenance and upkeep of properties, and further provisional allowances from earnings and income for accruing deterioration and obsolescence, and for depletion of natural resources, amounted to $154,869,091, a reduction of 8.64 per cent from the comparative item of 1929.

Total expenditures of $144,439,895 were made during 1930 for additions and extensions and the like. This included $114,960,815 for manufacturing properties, exclusive of by-product coke plants. Relatively large expenditures were incurred in carrying forward the extensive program outlined in the report for 1929 which had been determined upon after a thorough survey of requirements needed to rehabilitate a number of departments, to extend facilities to conduct operations on a more economic basis, and to provide for the production of steel products of newly developed types.

The properties and business of the Oil Well Supply Co., a Pennsylvania corporation, were acquired as of Oct. 1, 1930, at an inventoried appraised value of $19,057,930, including the company's net working assets.

Capital expenditures in 1930 were $175,030,528, compared with $59,329,674 in 1929, the corporation having completed last year its negotiations for the purchase of Columbia Steel Corp., and Atlas Portland Cement Co., as well as the Oil Well Supply Co.

At the close of 1930 the balance unexpended under appropriations for extensions, additions and improvements formally authorized totaled $90,500,000. The remainder of the program is under study and will be released for procedure from time to time.

Available rated annual blast furnace capacity at the close of 1930 was 21,737,000 tons, an increase of 658,000 tons. For steel ingots and castings the capacity was 26,075,000 tons, a gain of 912,000 tons; and for finished products for sale, 18,371,000 tons, an increase of 666,500 tons.

The extent to which the Steel corporation succeeded in stabilizing labor conditions is indicated by the fact that the average number of employes on payroll in 1930 was 211,055, a decrease of only 13,925, or 6.19 per cent, from 1929. For the manufacturing properties the reduction was only 4.87 per cent, but for the coal and coke properties it was 17.45 per cent. Further comparisons:

Employes of	1930 Number	1929 Number
Manufacturing properties	154,248	162,139
Coal and coke properties	18,024	21,834
Iron ore properties	10,634	10,876
Transportation properties	23,274	24,742
Miscellaneous properties	4,875	5,389
Total	211,055	224,980
Total wages and salaries	$391,271,366	$420,072,851
Largest number of employes in any one month—May	229,585	237,344
Smallest number of employes in any one month—December	178,349	202,102
Average earnings per employe per day: All employes exclusive of general administrative and selling force	$5.80	$5.84
Total employes, including general administrative and selling force	$5.99	$5.99

Steel Corporation Statistics

Year	Gross receipts	Net earnings	Capital expenditures	Production steel ingots gross tons	Production finished steel for sale, net tons	Shipments finished products net tons	Number of employes
1930	$1,180,934,971	$157,710,231	$175,030,528	16,726,472	11,609,265	11,624,294	211,055
1929	1,509,584,637	265,838,932	59,329,674	21,868,816	15,302,669	15,234,355	224,980
1928	1,374,443,432	200,986,299	51,570,108	20,105,749	13,972,388	13,973,129	221,702
1927	1,310,392,861	172,315,489	97,585,998	18,486,444	12,979,282	12,993,283	231,549
1926	1,508,076,090	207,345,153	76,060,520	20,306,668	14,334,412	14,279,929	253,199
1925	1,406,505,195	173,783,424	70,893,944	18,898,697	13,271,010	13,388,846	249,833
1924	1,263,711,468	161,183,467	79,619,986	16,478,857	11,722,908	11,526,890	246,753
1923	1,571,414,483	187,953,667	60,762,920	20,329,950	14,721,469	14,373,822	260,786
1922	1,092,697,772	109,788,916	23,551,991	16,082,385	11,785,331	11,911,904	214,931
1921	986,749,719	100,791,279	70,091,866	10,966,347	7,860,334	7,958,833	191,700
1920	1,755,477,025	185,095,359	102,956,133	19,277,960	14,228,502	14,098,707	267,345
1919	1,448,557,834	152,290,639	87,091,514	17,200,373	11,997,935	12,243,183	252,106
1918	1,744,312,168	208,281,104	129,855,037	19,583,493	13,849,493	14,124,986	268,710
1917	1,683,962,552	304,161,471	117,977,117	20,285,061	14,942,911	15,370,105	268,058
1916	1,231,473,779	333,574,177	64,680,648	20,910,589	15,460,792	15,542,088	252,668
1915	726,683,589	130,396,011	15,537,431	16,376,492	11,762,639	10,982,748	191,126
1914	558,414,933	71,663,615	28,171,013	11,826,476	9,014,512	9,078,559	179,353
1913	796,894,299	137,121,844	41,999,098	16,656,361	12,374,838	12,168,758	228,906
1912	745,505,515	108,174,673	13,780,361	16,901,223	12,506,619	12,696,935	221,025
1911	615,148,839	104,305,466	49,430,851	12,753,370	9,476,248	9,460,169	196,888
1910	703,961,424	101,054,754	53,101,221	14,179,369	10,733,995	10,727,751	218,435
1909	646,382,251	131,491,414	37,916,250	13,355,189	9,859,660	9,691,290	195,500
1908	482,367,840	91,847,710	49,422,697	7,838,713	6,206,832	7,102,456	165,211
1907	757,014,767	160,964,078	66,981,252	13,099,548	10,376,742	10,451,488	210,180
1906	696,756,926	156,624,273	32,155,146	13,511,149	10,578,433	10,862,425	202,457
1905	535,331,736	110,787,653	24,395,408	11,995,239	9,226,386	.....	180,158
1904	444,405,430	73,176,522	17,957,946	8,406,378	6,792,780	.....	147,343
1903	536,572,871	100,171,152	31,042,135	9,167,960	7,635,690	.....	167,709
1902	560,510,479	133,303,763	16,586,531	9,743,918	8,197,232	.....	168,127
1901	.....	84,779,293	.....	8,854,820	.....	.....	.....

*After federal taxes.

Sheet Sales and Output Increase in February

Steel sheet sales averaged 6020 net tons daily in February, an increase of 3.1 per cent over January, according to the National Association of Flat Rolled Steel Manufacturers, Cleveland. Output averaged 6865 tons, a gain of 26.7 per cent, and shipments were 6398 tons, an advance of 16.4 per cent over January. The association's current report follows:

	Net tons	Per cent of capacity
Total sales for February	168,564	50.2
Total production	192,218	57.2
Total shipments	179,133	53.3
Unfilled tonnage March 1	343,439	102.3
Approximate finished stock on hand awaiting shipment	89,567	26.7
Approximate in stock, unsold	92,047	27.4

Total sheet capacity in the United States for February was 496,850 net tons, and the capacity on which the foregoing figures are based was 335,850 tons.

Babbitt Metal Output Gains as Year Begins

Statistics on babbitt metal by the department of commerce reveal January production the highest since October, according to report of 43 concerns. Of these establishments, 33 report sales only, 10 consumption of their own production and five both sales and consumption. Monthly summaries follow:

In Pounds

1930	(a) Total production	(b) Sales	(c) Production for own use
Jan.	4,597,020	3,584,520	1,012,500
Feb.	3,930,516	2,997,711	932,805
March	5,429,440	4,402,000	1,027,440
April	4,036,260	2,994,023	1,042,237
May	4,072,853	3,139,884	932,969
June	3,912,744	2,742,435	1,170,309
July	3,060,962	2,160,505	900,457
Aug.	2,918,043	1,964,213	953,830
Sept.	8,892,287	1,850,468	1,041,819
Oct.	3,101,187	2,068,544	1,032,643
Nov.	2,695,087	1,904,256	790,831
Dec.*	2,106,522	1,459,208	647,314
(Year)*	42,752,921	31,267,767	11,485,154
1931			
Jan.	2,852,227	2,086,108	766,119

(a) By 43 reporting establishments.

(b) By 33 manufacturers who produce for sale, including 5 who also report consumption of their own metal.

(c) By 15 establishments which manufacture their own metal, including 5 which also produce for sale.

*Revised.

Ryding Sees Improvement

Birmingham, Ala.—"We are now moving out of the phase known as the business depression and are moving into an area of business improvement," said H. C. Ryding, president, Tennessee Coal, Iron & Railroad Co., before the Birmingham, real estate board recently.

Machine Tool Orders Decline Checked by Gain

February orders for machine tools show an encouraging improvement over January, the best recovery being made by the B group composed of companies whose base period shipments amounted to $10,000 to $50,000 per month. Cancellations ran at about the usual rate for February, and shipments likewise hold around the levels established the past few months. Unfilled order index rose to the December level. Following shows actual orders by months, not to be confused with the three-month moving average:

1930	*Index A	*Index B	*Index C	Total
Feb.	156.7	201.9	202.8	170.2
March	174.8	191.7	240.0	181.2
April	171.4	199.5	200.3	179.1
May	119.5	182.5	145.6	135.1
June	121.8	132.7	162.2	125.8
July	78.4	124.4	132.9	91.1
Aug.	102.4	153.9	119.1	113.8
Sept.	129.7	138.8	215.9	135.9
Oct.	81.3	112.3	118.1	90.1
Nov.	56.0	67.8	96.6	60.4
Dec.	58.4	92.7	126.6	68.8
(Year's Average)	119.8	146.4	164.7	127.8
1931				
Jan.	64.6	75.1	68.6	66.9
Feb.	68.3	129.8	93.1	83.7

*Note—Index A, base over $50,000; Index B, bases $10,000 to $50,000; Index C, base less than $10,000. Base: average shipments for years 1922-23-24. Totals: The total of all reports is not an average of A, B and C, but the sum of each item in percentage of the total base.

Continental Shares Sued for Accounting

Baltimore—An injunction to prevent the holding of a meeting of stockholders of Continental Shares Inc., engaged in the investment trust business, and holding securities in iron and steel companies, scheduled for March 17 in Baltimore was issued by Judge Samuel K. Dennis in circuit court on a suit filed by George L. Gugle, Columbus, O., a stockholder.

The suit claims that mismanagement by officers of the company have caused a shrinkage in assets amounting to $38,395,171. A number of officials also were named as defendants, including Cyrus S. Eaton. The suit asks for an accounting and that the defendants be held liable for alleged losses. It is charged that liabilities of large sums were incurred through improvident purchases of corporate securties and in other ways during the industrial depression.

The plaintiff said the meeting was called today to ratify contracts and acts of the company, and the officers would ratify their own alleged illegal acts. It was further claimed that on June 30, 1930, the company's balance sheet showed investments of $118,199,050 and that these had risen to $147,899,348 by Dec. 31, 1930. Mr. Gugle charged that purchases were made for the benefit of Mr. Eaton to keep him in a dominating position in certain parts of the industrial business of the country. Mr. Gugle holds 748 shares of the company's stock.

Canada Changes Tariff on Several Sheet Imports

A regulation has been established in Canada by an order-in-council dated March 11, designated as Tariff No. 798, by which the following iron and steel products are admitted free of duty into Canada from all sources from Jan. 1 to Aug. 31, inclusive, or unless previously dealt with by parliament:

"Sheets of iron or steel, cold-rolled, when imported by manufacturers for use exclusively in the manufacture of sheets coated with tin; and sheets, hoops, bands, or strips of hot-rolled iron or steel when imported by manufacturers for exclusive use in the manufacture of sheets, hoops, bands or strips coated with zinc of other metals, not including tin, in their own factories."

Employment Gain Indicates Upward Trend, Says Doak

Washington—"The first satisfactory indication of a general upward trend since the stock market collapse in October, 1929," is the way Secretary of Labor Doak characterizes the gain of 1.4 per cent in industrial employment in February, and the increase of 7.5 per cent in payrolls. These gains exceeded the usual seasonal improvement in February over January. Last year they were only one-tenth of 1 per cent for employment and 3.5 per rent for payrolls.

Campbell Forecasts Gain

Youngstown, O.—The steel industry will show a gradual increase in volume of business over the remainder of this year, said James A. Campbell, chairman, in his annual statement to stockholders of the Youngstown Sheet & Tube Co. The company is still considering building a continuous wide strip mill costing $16,000,000.

Awarded Aircraft Washers

Philadelphia — Massachusetts Machine Shop Inc., Boston, has been awarded the contract for 250,000 flat steel washers for the naval aircraft factory, Philadelphia.

Industrial Men in the Day's News

R. B. McColl, President and Director, McIntosh & Seymour Corp.

FROM a railroad in Scotland he went to a locomotive builder in England, thence to one in Montreal, later to another in England, and in 1922 became identified with American Locomotive Co.

BETWEEN his Canadian and first English experience, he served the Eddystone Munition Co. until the armistice.

HE has been manager of the Schenectady, N. Y., engine plant since 1925, and now becomes president of an engine builder at Auburn, N. Y.

LOCOMOTIVES and engines have been the life companions of R. B. McColl in this country as well as in Canada, England and Scotland. As noted in STEEL of Feb. 5, he was elected president and director of McIntosh & Seymour Corp., Auburn, N. Y., builder of oil engines, to succeed A. E. Ballin, who retired Feb. 1.

Born in Kilmarnock, Scotland, in 1882, Mr. McColl attended Kilmarnock academy, and Science and Art college. After serving a special apprenticeship with the Glasgow & Southwestern railway at Kilmarnock, he worked in all departments, including the drawing office. He left the railway company to be draftsman for Robert Stephenson & Sons, Darlington, Eng., locomotive builders. In 1905 he removed to Montreal, Que., and became identified with Montreal Locomotive Works Ltd., serving, in turn, as small work department foreman, small tool supervisor, general machine shop foreman, assistant superintendent, superintendent of works, and finally works manager. He resigned in 1917 to become manager of the munitions department of the Eddystone Munition Co., where he remained until after the armistice.

Mr. McColl then returned to England to become general manager of the locomotive department of Armstrong Whitworth Co., where he had complete charge of building and equipping the locomotive works, and where he had charge of sales, engineering and manufacturing of locomotives. Later he also was made general manager of the pneumatic tool department and the gas and oil engine department. He likewise was director of the works board of all the Armstrong Whitworth Co.'s plants, which included shipbuilding and diesel oil engine building for marine work, etc.

In January, 1922, Mr. McColl again crossed the ocean and became affiliated with the New York sales office of the American Locomotive Co., where he remained until June of that year. He then was appointed assistant manager of the Schenectady, N. Y., plant and in 1925 was appointed manager there, which position he held until his recent promotion.

He is a member of the Institute of Mechanical Engineers, London, Eng. He also is a member of the Canadian Club of New York, Mohawk, Mohawk Golf, Schenectady Curling clubs, and is president of Schenectady bureau of municipal research, director of that city's chamber of commerce, and is a member of the executive committee of the mayor's committee on unemployment.

LEWIS A. WAY, formerly vice president in charge of sales of Pittsburgh Steel Foundry Co., Pittsburgh, has been appointed manager of production and sales in the roll department of the Ellwood City, Pa., plant of Aetna-Standard Engineering Co., Youngstown and Warren, O. Prior to his Pittsburgh Steel Foundry connection, Mr. Way was president of the Sharon Foundry Co., Wheatland, Pa., with which company he started in 1926.

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Matthew P. Graham, factory manager of Thompson Products Inc., Cleveland, has been appointed general manager of the Detroit plant of Thompson Products Corp.

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B. J. Larkin, recently connected with the J. I. Case Plow Works Inc., Racine, Wis., has been appointed manager of the Algoma Foundry & Machine Co., Algoma, Wis.

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N. R. Seidle, formerly general manager of McAleenan Bros. Co., Pittsburgh, was on March 1 elected vice president and general manager of Youngstown Boiler & Tank Co., Youngstown, O.

J. E. Julian has resigned from McAleenan Bros. Co., to become assistant treasurer of the Youngstown company.

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William A. Underwood was recently made president and assistant treasurer of Loring Coes & Co. Inc., Worcester, Mass., manufacturer of machine knives. For 23 years he has been connected with B. S. Roy & Sons Co., Worcester.

□ □ □

Charles G. Frances has been appointed works manager of Dittmer Gear & Mfg. Corp., Lockport, N. Y. He formerly was superintendent of Cunningham Motor Car Co., Rochester, N. Y., having been identified

with the automotive industry for about 20 years.

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J. W. Root has been appointed sales manager of Ben Sibbitt Iron & Foundry Co., Wichita, Kans.

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J. W. Wilford banker of Lansing, Mich., has been re-elected president of Melling Forging Co., that city.

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Earl K. Baker, of the Baker Wheel & Rim Co., Detroit, has been elected a director of Hoover Steel Ball Co., Ann Arbor, Mich.

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R. P. Daggitt has resigned as manager of sales of the Gulf States Steel Co., Birmingham, Ala. Duties are being carried on by his former office assistants.

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Ted Hodges has been appointed purchasing agent for Tulsa Boiler & Machinery Co., Tulsa, Okla., to succeed J. A. Gosnell, recently transferred to the sales department.

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Lewis T. Briggs has retired from active association with Erie Bronze Corp., Erie, Pa., resigning as vice president and disposing of his interest to Bert C. Edkin, who continues as president.

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E. J. Madden, for several years distribution manager of the Air Reduction Sales Co. in the Milwaukee district, has been promoted to a similar position in the New York metropolitan district. He is succeeded in Milwaukee by H. B. Welch Jr. Samuel H. Smith is district manager at Milwaukee.

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Arthur H. Deute, who resigned as vice president and general manager of Billings & Spencer Co., Hartford, Conn., early this year, has become identified with the Hamman-Lesan Co., Los Angeles, advertising agency, March 1. He previously was identified with Batton Barton, Durstine & Osborne, New York, and with advertising agencies in Portland, Oreg.

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Dr. James Aston of A. M. Byers Co., Pittsburgh and Ambridge, Pa., inventor of the Aston process for mechanical puddling of wrought iron, has been made the 1931 chairman of the Pittsburgh section of the American Institute of Mining and Metallurgical Engineers.

Dr. E. A. Holbrook, of the University of Pittsburgh, is vice chairman and M. W. von Bernewitz continues as secretary.

□ □ □

H. R. Walters has been appointed assistant to George H. Blakeley, president, McClintic-Marshall Corp., Bethlehem, Pa.

John W. Marshall continues as assistant to Elbert A. Gibbs, vice president in charge of operations.

Jonathan Jones continues as chief engineer. C. H. Mercur has been made consulting engineer and C. A. Johnson, manager of sales.

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E. C. Gray has been appointed New York office manager for Yates-American Machine Co., Beloit, Wis., to succeed D. S. Oakley, now district manager at Detroit for J. A. Fay & Egan Co., Cincinnati, as noted in STEEL of March 5.

Wickwire, American Wire Reorganize Sales Forces

R. L. Foster, general sales manager, Wickwire Spencer Steel Co., and its subsidiary, the American Wire Fabrics Corp., New York, has reorganized the general sales department of these companies and announces the following appointments: Wire and spring department, A. G. Bussman, manager, and E. C. Stout, assistant manager, with Mr. Stout in charge of spring sales; wire rope department, R. H. Cherry, manager; mechanical specialties department, J. R. Worsford, manager; hardware and structural products department, W. C. Vaughn, manager, and A. A. Wilmot, assistant manager.

An eastern district sales organization for the two companies has been established at 41 East Forty-second street, New York, with Roger H. Clapp district sales manager and George Sorsenson assistant district sales manager. This office will have supervision of sales in the district starting with western Connecticut and eastern New York and including the Atlantic coast states to and including North Carolina.

In mid-western territory, T. H. McSheehy, at 208 South La Salle street, Chicago, has been appointed district sales manager for the two companies, succeeding C. R. Coffeen, resigned.

W. J. Coleman, who has had charge of the Portland, Oreg., sales office of the two companies, has been placed in charge of the Seattle, office as well as retaining charge at Portland.

All other sales representattvies of the two companies remain as heretofore.

Products manufactured and marketed by the Wickwire Spencer Steel Co. include wire ropes, wire of all specifications, wire springs and wire forms, perforated metals, grilles, card clothing, high temperature wire conveyor belts, heavy duty conveyor belts, electrically-welded fabric for concrete reinforcement and chain-link fence.

Products manufactured and marketed by the American Wire Fabrics Corp. include screen wire cloth, hardware cloth, poultry netting, miscellaneous nails and brads, door springs, wire clothes lines and other specialties for the hardware trade.

Obituaries

CHARLES SANFORD KNIGHT Jr., 67, sales manager of electrical wire and wire rope, American Steel & Wire Co., Chicago, died March 11 at El Paso, Tex., while on a business trip. A native of Worcester, Mass., he started work in 1878 at the plant of Washburn-Moen Mfg. Co., there, at 14 as a weigher and timekeeper. He later became foreman and was advanced to the sales department. He served as assistant manager at Dallas, Tex., and then became sales representative in the Worcester district. For a number of years Mr. Knight was manager of the Pittsburgh sales office and remained with that company after it was absorbed by American Steel & Wire Co. In 1900 he was made manager of sales of electrical wire and wire rope of the American company at Chicago. Mr. Knight was widely known in the electrical and power industries. He was a member of numerous clubs and associations.

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Isaac D. Hetzell, treasurer and director, Keystone Drawn Steel Co., Spring City, Pa., died recently.

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Charles W. Darrow, 65, for 20 years president of Darrow Sheet Metal Works, Benton Harbor, Mich., died March 3.

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Alfred B. Botfield, 83, founder of Botfield Furnace Specialties Co., Philadelphia, now Botfield Refractories Co., died recently in Miami, Fla. He retired in 1915.

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John R. Mulcare, 58, Buffalo district manager for American Car & Foundry Co., New York, for the past ten years, died at Buffalo March 13. Previous to 1921 he was estimator for Pressed Steel Car Co., Pittsburgh.

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Henry McDermott, 86, pioneer in iron mine development in northern Michigan, died March 8 at his Milwaukee home. While prospecting from Norway to Iron Mountain, Mich., for Luberman's Mining Co., he discovered the Ludington mine at Iron Mountain. He retired in 1921 after prefecting an underground loader for mines and various safety devices.

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Howard C. Woglom, 57, who retired in 1926 as plant manager for Taylor & Fenn Co., Hartford, Conn., having served in that capacity for eight years, died March 7. At 16 he was employed by Brown & Sharpe Mfg. Co., Providence, R. I. In his early twenties he located in Hartford, becoming associated with Pope Mfg. Co., and others. For 17 years he was with Pratt & Whitney Co. He

resigned during the World war to enter governmental service and later became connected with Colt's Patent Fire Arms Co. He next went with Taylor & Fenn Co.

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David Meyers, 75, assistant superintendent of Illinois Steel Co., Chicago, died recently.

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George W. Gloeckner, vice president of Julius Blum & Co., Inc., New York, dealer in iron and steel products, died recently.

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William Matthews, 68, formerly of Columbus, O., and identified with International Harvester Co., Chicago, for 45 years, died March 6 in West Palm Beach, Fla.

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Phillip S. Manley, 59, identified with Buckeye Steel Castings Co., Columbus, O., for 13 years, died March 6. He had charge of the gas manufacturing department.

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William J. McAleenan, who retired about 11 years ago after the McAleenan Boiler Co., Peoria, Ill., was dissolved, of which he was head for about 25 years, died at Los Angeles March 4.

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Gerald W. Hart, 74, founder and president of the Hart Mfg. Co., Hartford, Conn., died recently at his home in that city. Mr. Hart for more than 40 years was engaged in the manufacture of electrical supplies.

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Charles E. Griffith, 77 who retired in 1929 after a half century connection with Illinois Iron & Bolt Co., Carpentersville, Ill., died March 4 at West Dundee, Ill. He entered the company's employ in 1873 as office clerk, becoming secretary in 1888, in which capacity he served for more than 30 years.

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Charles F. Morgan, 54, assistant treasurer, comptroller and a director of Morgan Construction Co., Worcester, Mass., died March 3. Born in Manchester, Mass., he early located in Worcester. He was educated at Worcester Polytechnic institute and at Harvard university. His father was associated with his brother, Charles H. Morgan, in the Morgan Spring Co., now the Morgan plant of Wickwire Spencer Steel Corp.

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Charles de Wendel, who retired from the French iron and steel industry in 1911 to live in Touraine, France, died there March 3. After obtaining his scientific education in France, Mr. de Wendel studied mill and foundry practice in the United States for five years and then entered the de Wendel foundries at Hayange in Lorraine, then German territory. With his cousin he directed the plants from 1903 until his retirement in 1911.

Here and There in Industry

COOPER ALLOY FOUNDRY CO., Elizabeth, N. J., has been organized to manufacture corrosion and heat-resisting alloys and has taken over the plant at 150 Broadway, Elizabeth, formerly operated by the William J. Sweet Foundry Co., Newark, N. J. The complete organization of the Sweet company has been absorbed by the new company. Harry A. Cooper, formerly president of the William J. Sweet Foundry Co., is president of the new company.

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Hyatt Roller Bearing Co., Newark, N. J., has moved its western sales division at Chicago from 111 West Washington street to the Carbide & Carbon building, 230 North Michigan avenue.

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Campbell Industrial Window Co., New York, has established a southern distributing branch at 4300 Washington avenue, New Orleans, in charge of Owen Barry, formerly with Woodward, Wight & Co.

□ □ □

Vacuum Cotton Harvester Co., St. Louis, has taken an order from the Russian soviet government for $50,000 worth of cotton harvesters for collective farms in Turkestan. This is the third order of this kind this company has taken for Russian use.

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Chicago Bridge & Iron Works, Chicago, has moved its Tulsa, Okla., sales office to 632 Exchange National Bank building. T. L. Jarvis has been transferred from the Dallas, Tex., office to assist D. A. Leach, sales representative at Tulsa.

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Southwestern Can Co., Houston, Tex., has completed plans for a new manufacturing plant to cost $150,000, 180 x 350 feet, three stories, and of monitor type with unusual ventilation features. H. O. Westwood is president and general manager.

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Missouri Rolling Mill Corp., St. Louis, is completing a plant for the manufacture of steel transmission towers, including a galvanizing plant operated by natural gas. The galvanizing tank will be 30 feet in length. The plant consists of a steel building 62 x 160 feet, with a wing 80 x 100 feet and a brick building 45 x 65 feet.

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Westinghouse Electric International Co., export subsidiary of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has taken an order from Ryobi Denki Shokai, Japan, for 12 circuit breakers for use in the Tokyo district. Two of the circuit breakers are rated at 2000 amperes, 25,000 volts, and the remaining ten are 1200 amperes, 25,000 volts. The works at East Pittsburgh will fabricate the order.

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Perin & Marshall, consulting engineers, 11 West Forty-second street, New York, have been dissolved by mutual consent. The company was formed in 1914 and consisted of Charles Page Perin, Stewart M. Marshall and Frank L. Estep. Perin Engineering Co. Inc., has been formed, with offices at the same address. Mr. Perin will be president, Mr. Estep, vice president and chief engineer, and David J. Ogilvie, secretary and treasurer.

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Foster Wheeler Corp., New York, has bought the plant and business of the D. Connelly Boiler Co., Cleveland, which was established 56 years ago. The plant will be continued in operation and its output rounds out the line of the purchaser in the steam generating field. William C. Connelly is president and treasurer and Lawrence E. Connelly vice president and secretary of the Connelly company. J. J. Brown is chairman, P. W. Foster vice chairman and L. B. Nutting president of the Foster Wheeler Corp.

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Central Iron & Steel Co., Harrisburg, Pa., is installing a battery of waste heat boilers in connection with its open-hearth furnaces. These boilers are of a new fire-tube type, designed by the company. The first of these units, hooked up with a 100-ton basic open-hearth furnace, is 22 feet long and 9 feet in diameter, equipped with 470 tubes 2½-inches in diameter. A large fan will exhaust the open-hearth gas through the boiler at high velocity. This unit is designed to furnish 500 horsepower for operating the rolling mill engines, through a 12-inch steam line 2450 feet long. The installation is based on the company's experience with nine fire-tube waste heat boilers, each of 150 horsepower, operated for several years in conjunction with its heating furnaces. The company also has installed on one of its open-hearth furnaces a set of water-cooled damper valves.

MIRRORS of MOTORDOM

DETROIT

F. O. B. Detroit," a base pricing term for Fords dating back to the early days of the automobile industry, gives promise of passing from the picture with the persistant report that Ford will soon go to an f.o.b. delivered point price on model A.

Irrespective of the distance from Dearborn, there will be a standardization of base prices on all models, replacing the present arrangement of sliding scales on list and delivered prices.

Henry Ford has 33 assembly plants the country over and it has been his practice to ship knocked-down manufactured parts, obviously more cheaply shipped than assembled cars, to district assembly plants to be put together. The freight item has been a particularly lucrative income to Mr. Ford, and opinion runs currently that once committed to a f.o.b. delivery point price, the die is cast, and to return to the old f.o.b Detroit figure would be a difficult proposition.

Ford Production Booms

Just what action the remainder of the auto industry will take is difficult to forecast at this time. Chevrolet, as Ford's chief competitor, may be forced to the new basing price plan; the rest of motordom probably would follow. Nash now has an inclusive price for all extras giving the customer a price for the delivered car; Hudson-Essex once attempted a "delivered-at-your-door" policy, but generally speaking the auto industry in Michigan has been practically unanimous in making Detroit a base point, and making the customer pay the freight.

Meanwhile, Ford production is a bright spot. Ford assembly lines will turn out about 95,000 to 100,000 passenger cars and trucks in March, going at approximately 7000 units daily, three and four days the week. For April the tentative figure for Ford's is 120,000 units.

Ford's parts manufacturing units at Fordson work three days a week and the steelworks, or more especially ingot production, is at five days weekly.

Ford is now proceding with the erection of a 400-ton open-hearth steel furnace of the tilting type, claimed to be the world's largest. This furnace will replace No. 10 of the existing furnaces, each of 100 tons, and there is some belief that Ford may eventually tear out Nos. 7, 8, 9, and 10 furnaces, though this is speculation.

Starts 400-Ton Open Hearth

The new open-hearth with its large capacity, to find the possibility of which Ford representatives toured leading steelworks recently, is either for more intense concentration on scrapping aged wrecks and thereby creating more potential model A purchasers, or for concentration on actual production of ingots to supply Ford parts makers with material. As an indication of the latter is a fresh wave of the old Ford practice of ordering for or supplying steel to his contract parts makers.

It seems unlikely that Ford will add to his existing finishing capacity in bar, strip, and spring-stock stands. The Ford steelworks have never been on a purely commercial basis because rollings have been generally for relatively small tonnages, often around 50 tons, roll changes have been frequent, and superintendent changes have been the same.

There is nothing to be gloomy about in reports of performances by the auto producing and assembly lines. With a continuous unbroken upcurve in output, March bids certain to better the estimated 230,000 units for February. An estimate for March is 290,000 units.

To Ford, who has stepped up to 7000 daily, something like the lush days of 1929; to Chevrolet, now at an average of 3200 daily; and to increases from those of the next rank—Buick, Hudson-Essex, Oakland-Pontiac and Willys—can be credited the chief impetus to expanding activity.

By this token, March should see an approximate 80,000 cars produced, aside from the expected 190,000 from combined Ford and Chevrolet plants.

For the industry, about 60,000 cars were produced this week, against 58,000 last week, 54,000 the week before, but the current week of 1930 showed 83,000 units for the entire auto industry.

Chevrolet is making about 3200 cars on the average daily, 5 days a week. This rate will necessarily be increased to attain the 79,000 units aimed at for March. However, this unit of General Motors remains steady and its production curve is an even one.

"Bumpers for Springs"

Chevrolet will build its own bumper plant, structural steel for the plant building being awarded last week, and plans just having been released.

For some time bumpers for the Chevrolet have been built by the Standard Steel Spring Co., Coraopolis, Pa., and the Badger Die Casting Co., Milwaukee. A while back Chevrolet exchanged its bumper manufacture work with the Standard company in return for the production of springs, an item which the Standard company had made.

Spring production was brought to Detroit and installed in the Chevrolet gear and axle and forge plants.

(*Concluded on Page* 64)

EDITORIAL

Mechanical Burden Bearers of Modern Industry

TO THE engineer of today the Great Pyramid stands as a monument to those slaves who suffered and died by the thousand in the course of its long, painful construction, rather than as any worthy tribute to the ancient autocrat by whose command this structure was raised. The engineer knows that, should pyramid building be in vogue in this day and age, any one of many large contracting companies would be able to execute the job in months instead of years and to the advantage of the workmen instead of to their destruction. Modern material handling equipment would make this possible, just as it is making possible hundreds of projects which in size, intricacy and practical value overshadow the Great Pyramid completely.

No great amount of contemplation is required on the part of anyone with even rudimentary knowledge of industrial conditions to realize that any country or any industry wherein "strong backs and weak minds" predominate is a decadent country or a decadent industry. Discussions of the so-called "industrial revolution" which has occurred—particularly in America—during the past century have largely been confined to the transfer of skill from men to machines. The parallel transfer of burdens from men to machines has, for some reason, received much less attention than it deserves. Without it the mechanization of industry would have been completely unbalanced, with interchangeable manufacturing projects possible only in small, inefficient units, and with high grade mechanical products available only to the wealthy.

Importance of Less Spectacular Units Has Been Overlooked

Popular fancy always is attracted by the huge and the spectacular, and for that reason the general conception of material handling machinery is confined to the romance of railroads, steamships, great ore handling cranes, etc. The vital part played by the humble factory truck, the small electric hoist, the portable tiering machine, the conveyor chain and numerous other obscure mechanical burden bearers is all too little appreciated. Nor is this lack of appreciation confined to the public, it is common among industrial executives and among financial leaders who hold industrial purse strings.

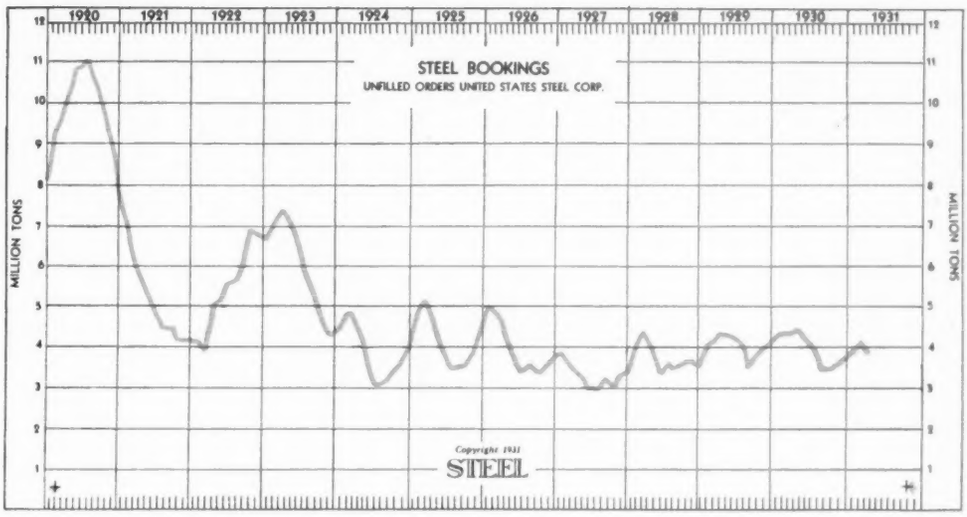
The Industrial Revolution as it affected production machinery did not occur over night, or in any short space of time, as many people have been led to believe. It occurred gradually over a long period of years, with high points now and then due to important developments in specific machines. It was realization of the great change which came with more or less suddeness, as a result of a vast accumulation of achievement over many years. Such realization was hastened by world's fairs, by popular writers on industrial subjects, by floods of low priced products and by economic crises brought on by undigested economic changes.

Rising Tide of Interest Now Evident in Material Handling Technique

During the past 15 years there have been increasing signs of awakening realization of the importance of changing material handling technique. Management societies have been formed and have given increasing attention to material handling methods and equipment. Divisions of the older engineering societies have been organized for the same purpose and have grown rapidly. Consulting engineers have begun to specialize in material handling subjects. Companies which originally built material handling equipment as casual side lines have devoted more and more attention to it until they too have become specialists. Large manufacturing organizations, particularly in the metal working field, have begun to design their new plants around material handling equipment, just as they used to design them around power generating and transmitting equipment and production machinery.

And now at last a point of outstanding importance in the progress of material handling is reached as plans mature for bringing together engineers, builders and users of material handling equipment. Such a congress of experts in management, maintenance and material handling is scheduled in Cleveland April 13-17 inclusive, in conjunction with an extensive exhibition of industrial material handling machinery and related equipment. The American Society of Mechanical Engineers, the Society of Industrial Engineers and several other organizations of national repute have built up a joint technical program which should exert a powerful influence in promoting understanding interest in the "burden bearers of industry" among those most vitally concerned.

THE BUSINESS TREND



Thousand Tons

1930

Feb. 4,479
Jan. 4,469

1929

Dec. 4,417
Nov. 4,125
Oct. 4,086

Thousand Tons

1931

Feb. 3,965
Jan. 4,132

1930

Dec. 3,943
Nov. 3,639
Oct. 3,482

Slow Progress Continues Despite Irregularities

BUSINESS not only is peering about for signs of recovery from depression, but also is taking cognizance of an expected seasonal rise. The resulting complications of usually dependable business statistics obscure the true situation. Just now there are many signs that moderate gains continue to be made but still there are a number of elements blocking the path to substantial improvement and progress is neither vigorous nor all-encompassing.

Comparisons with the same period last year in a great many instances are unfavorable. On the other hand a conservative attitude is now evident which cannot be attributed to the early part of 1930, and apparently business is resigned to the prospect of a very slow recovery. In this respect revisions in attitude have taken place since the beginning of the present year.

A spring resumption of building activity shows signs of getting under way, with correspondingly better prospects in structural steel. Automobile production shows no change from the trend of slow improvement. With January and February generally a matter of dealer stocking, March may show more clearly what the consumer is able to do.

Production and Consumption Balance Closely; March Operations Gain More Slowly

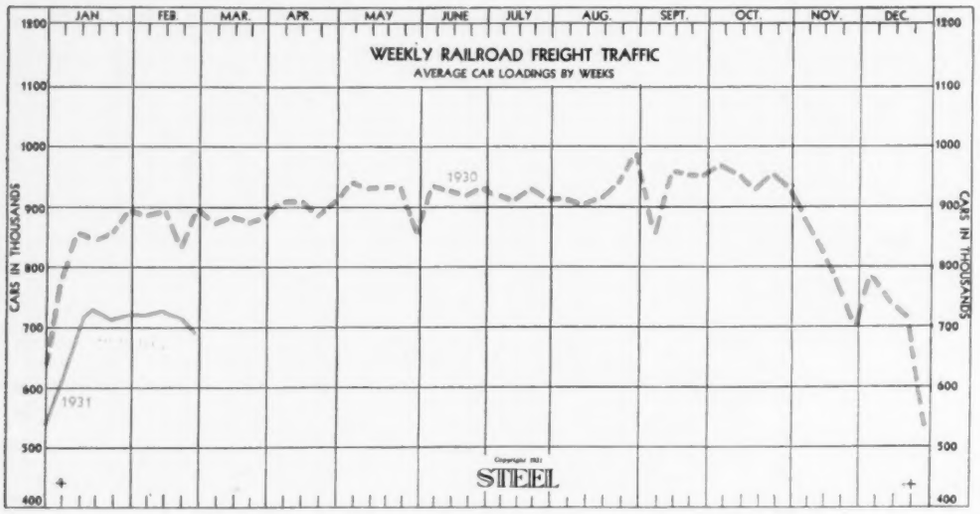
In iron and steel, production in practically all lines is closely attuned to the rate of consumption. So far as steelworks operations are concerned early March increases in operations were made at a slower rate than during most of February. Last week they gained fractionally. The report of the United States Steel Corp. showing that steel bookings were down 167,157 tons as of Feb. 28 is interpreted chiefly as due to a slightly faster expansion in operations than in shipments or orders.

Reports on commercial activities offer at least temporary encouragement at a time when even the smallest favorable signs are regarded closely. The Federal Reserve board finds that February retail trade increased slightly over January, and that banks are in a better position. Mercantile circles find moderately increasing participation in spring trade as the Easter season approaches, but the increase is by no means more than seasonal. Weekly figures for commercial failures are subsiding somewhat from the feverish heights of a month ago.

Further Attempts to Stabilize Prices Hampered by Inequalities

Many of the irregularities of the current situation are in the price structure. The various wholesale commodity price indexes are virtually unanimous in recording fractional gains. However, it is more important to note that the component parts of most of the price indexes still show depressing signs of inequality of deflation. Present indications point to the belief that second quarter prices of iron and steel will be no lower, and in some instances may be a little higher.

Alvan T. Simonds has made a comprehensive study of business cycles. Elsewhere in this issue is a chart compiled by him of the relationship between money rates and business activity. Previously his figures had shown the direct relationship between the two for the postwar period. Now the same trends are graphically shown to have prevailed for at least fifty years.



	1931	1930
Feb. 28	682,000	899,498
Feb. 21	713,938	827,560
Feb. 14	720,689	893,140
Feb. 7	719,053	885,816
Jan. 31	719,281	898,835

Holiday Observance Brings Car Loadings to Low Point of February

Statistics for weekly freight traffic for the last week in February indicate a decline of 31,938 cars loaded, the total for the week being 682,000 cars. This is the second successive decline, and for the first time since January two consecutive weeks have shown the same trend. Observance of a holiday is credited with being responsible for the sharpness of the drop. The corresponding week last year did not contain the holiday, and at that time increased to 899,498 cars compared with 827,560 cars in the preceding week. The holiday drop last year was from 893,140 cars to 827,560 cars, and this year's drop is no more than usual, in terms of per centage.

Iron and Steel Price Index Holds at Alltime Low

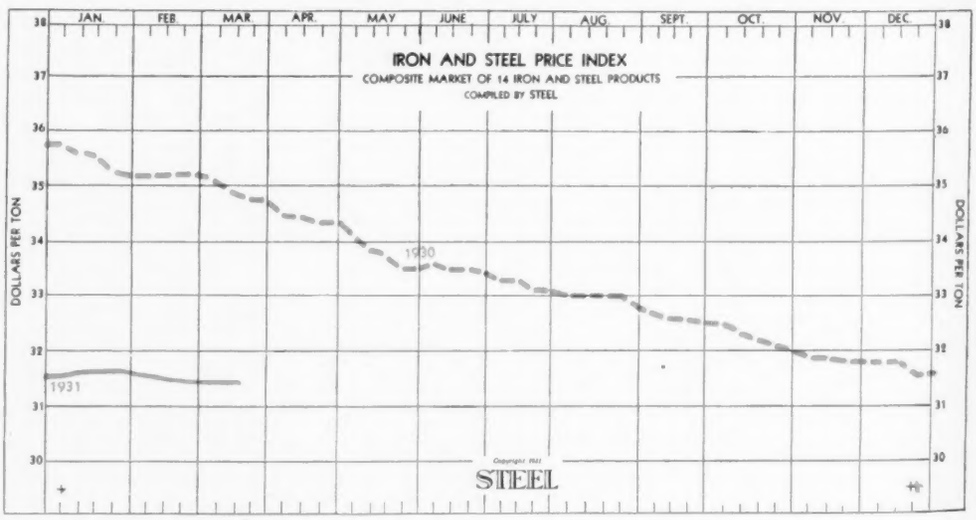
Since Feb. 18 STEEL's composite of iron and steel prices has remained steady at $31.61, an alltime low, and last week it was unchanged. At the time of the last decline, the drop amounted to eight cents, due to readjustments in pig iron at Pittsburgh and in the valley. The February monthly average also set a new low, at $31.65. In 1930 the second week of March found the index at $34.94, and two years ago it was $36.37. With the approach of the second quarter, there is slight possibility that there will be any significant change one way or the other until bookings have given a test to prices on bars, plates and shapes, and upon wire products.

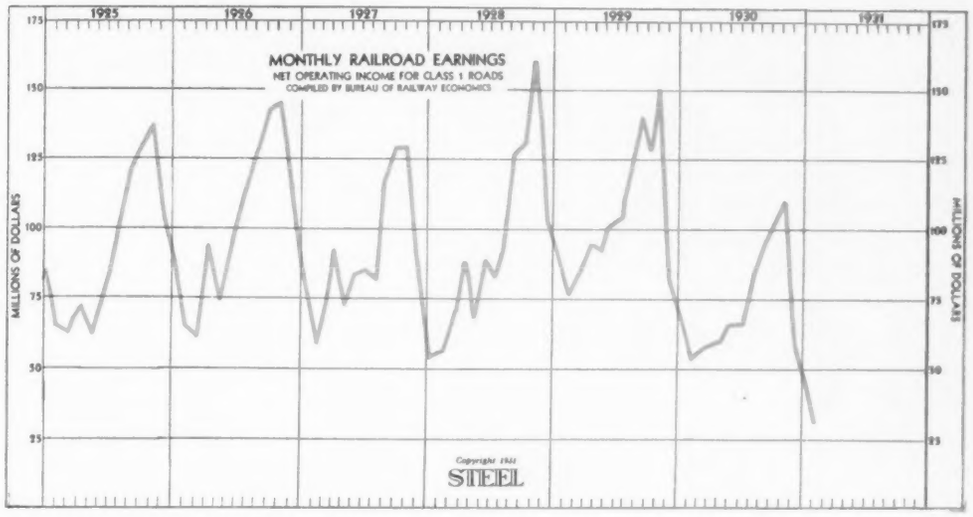
Weekly Figures

March 11	$31.61
March 4	31.61
Feb. 25	31.61
Feb. 18	31.61
Feb. 11	31.69
Feb. 4	31.69
Jan. 28	31.73
Jan. 21	31.73

Monthly Averages

February	$31.65
January	31.71
December	31.74
November	31.92


IRON AND STEEL PRICE INDEX
COMPOSITE MARKET OF 14 IRON AND STEEL PRODUCTS
COMPILED BY STEEL
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
DOLLARS PER TON
1930
1931
STEEL



Million Dollars

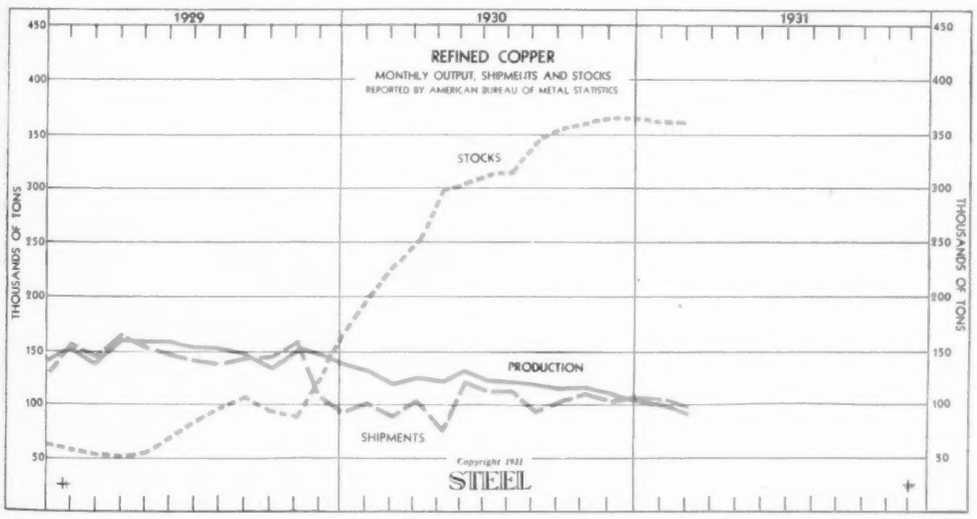
	1931	1930
Jan.	33.8	55.4
	1930	**1929**
Dec.	49.4	72.2
Nov.	62.1	86.6
Oct.	112.3	152.9
Sept.	104.1	133.9

Railroad Income Continues Decline to Still Lower Levels

Net operating income of 171 class I railroads descended in January to the lowest point in years and amounted to only $33,849,116, according to the Bureau of Railway Economics. Earnings were about 40 per cent under January, 1930, and considerably less than half the income of $77,261,598 in January, 1929. Although following the usual seasonal trend, the January decline was based upon a very low starting point, $49,371,769 income for December. Fifty-two of the railroads reporting operated at a loss during the month, of which 19 were in the eastern, eight in the southern and 25 in the western district. For several months gross income has dropped much more rapidly than operating costs plus taxes.

Copper Shipments and Production Improve in Daily Average Rate

Without allowance for the difference in the number of days in each month, February production and shipments of refined copper declined slightly from those of January, and total stocks decreased by a comparatively minute figure. For the month, production declined from 102,458 tons to 99,853 and shipments from 105,806 tons to 100,051. Stocks, amounting to 363,629 tons, were down only 198 tons after dropping 2657 tons in December and 3348 tons in January. For the third time, shipments were slightly above production, and February shipments as measured by the daily average rate were the best since last October. In terms of the daily rate, production increased, as did shipments, the latter retaining a very slight lead.



Stocks

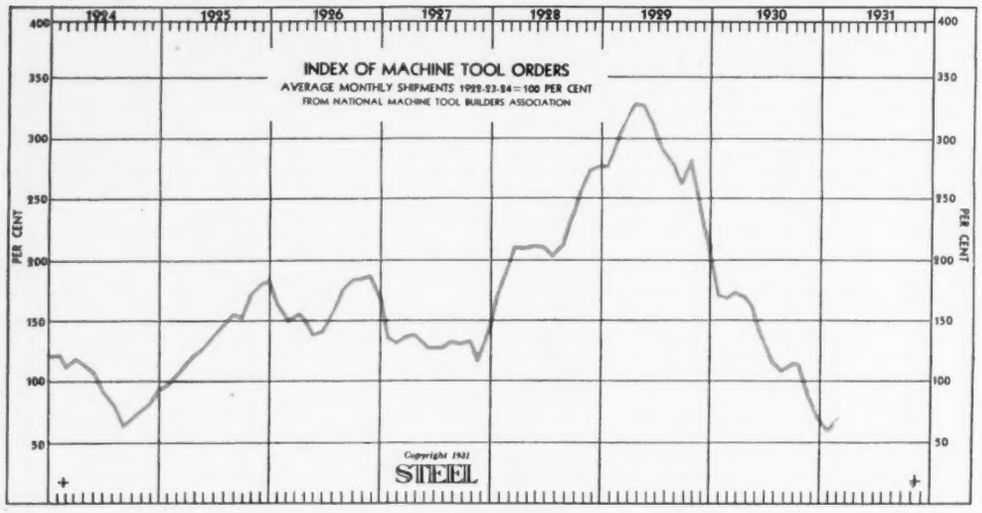
	Tons
February, 1931	363,629
January, 1931	363,827
February, 1930	233,123

Production

February, 1931	99,853
January, 1931	102,458
February, 1930	121,195

Shipments

February, 1931	100,051
January, 1931	105,806
February, 1930	91,476



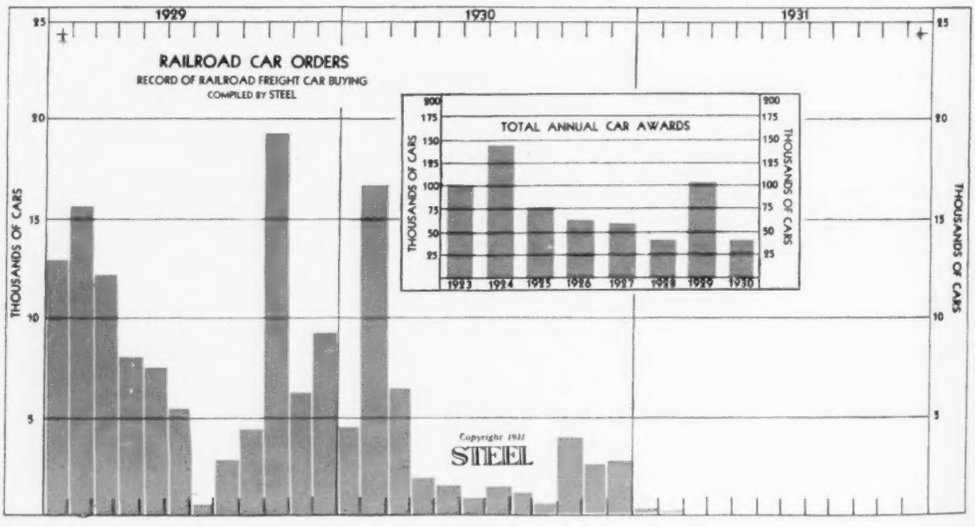
	1931	1930
February	73.1	172.6
January	65.3	175.4
	1930	**1929**
December	73.1	222.1
November	95.5	247.2
October	113.3	287.0

Machine Tool Orders Attain Mild Increase in February

A moderate revival in machine tool buying in February caused the National Machine Tool Builders' association index to move upward to 82.2 compared with 65.4 in January. As a consequence the three months' moving average gained from 65.3 in the previous month to 73.1 in January. Compared with the levels which preceded the drastic recessions of 1930, the index still is markedly subnormal, and the increase during the past month was relatively small. However, the past three months all have shown better activity than November, when the index was at its lowest for any single month. Shipments continue at about the same rate and unfilled orders are at a better ratio than for several months.

February Railroad Car Orders Drop to New Low Point

Indicating that carbuilding activity in February reached a state bordering on complete inactivity, car awards for the month are placed at 50, the lowest on record. The previous low month was February, 1919, with 60 cars awarded. February awards a year ago were for 17,027 cars, two years ago for 15,944 and three years ago for 10,220. January, with only 100 cars ordered, started the year off at low ebb. Current reports for the early part of this month indicate that March will see at least a partial recovery, but on the other hand, leading builders have expressed themselves to the effect that little business can be expected before next fall. At present only a little repair work is keeping shops from idleness.



	1931	1930
February	50	17,027
January	100	5,072
	1930	**1929**
December	2,729	9,710
November	2,621	6,361
October	4,116	19,506
September	576	4,517
August	1,111	2,854

Seamless Chrome-Nickel Steel Tubes Find Diversified Uses

BY H. D. NEWELL, Metallurgist

The Babcock & Wilcox Tube Co., Beaver Falls, Pa.

SINCE the introduction of Nirosta KA2, the heat, corrosion and acid resisting steel containing 18 per cent chromium and 8 per cent nickel, a rapidly growing list of applications has been found for this alloy, in its various forms. Among the forms for which the market is developing with surprising rapidity are seamless tubing and seamless pipe. A wide range of uses has been found for these products in many of the larger industries where heat, corrosion and acid resistance are of major importance.

As a pioneer in the development and commercial production of heat, corrosion and acid-resisting seamless tubing, The Babcock & Wilcox Tube Co., with works and general offices in Beaver Falls, Pa., is said to have produced the first of such tubing as early as 1923 and is today a principal producer of seamless chrome-nickel tubular products.

In the manufacture of tubes of this 18 and 8 alloy steel, precautions are taken to secure a uniform quality. Billets from which the tubes are fabricated, are made from selected stocks of raw materials. The metal is melted and refined carefully in basic-lined electric furnaces and only small heats are poured, to insure a clean homogeneous steel. After the ingots are rolled into the billet form, necessary for the fabrication of tubes, they are cut to the desired length and the entire surface machined to remove any defects.

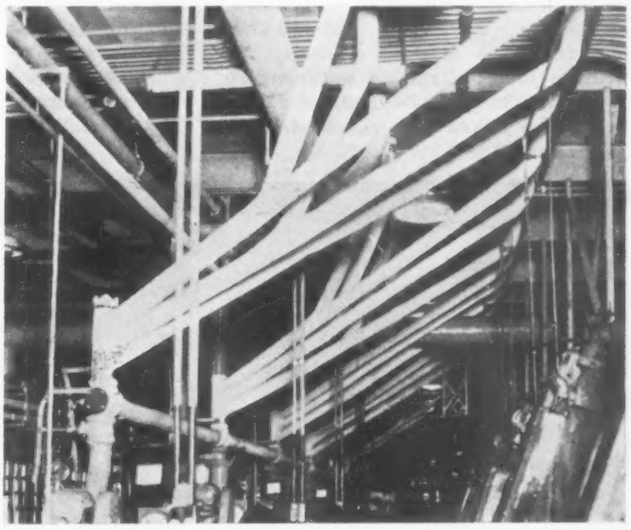
The billets carry a heat number stamped on the ends and considerable clerical work is done in the tube mill to preserve the identity of each heat. This is not always possible, particularly in the case of small cold-drawn sizes where the multiplicity of operations makes the necessary clerical work disproportionate to the advantage to be gained. When the billets are ready for piercing they are rechecked metallurgically, by the laboratory, to insure the fact that they will forge satisfactorily.

Billets are heated in a long, continuous oil-fired furnace which is under constant observation as part of a rigid temperature control system. Maintenance of a uniform temperature is essential in the piercing operation to follow.

Piercing is accomplished by passing the billet between two rotating rolls which are set at such an angle that they cause the billet to move forward spirally and, at the same time, be forced over a conically shaped tool, known as a piercing point, which is supported in the end of a long bar. As the billet passes over this piercing point, it takes a tubular form, the wall thickness being regulated by the space between the piercing point and the rolls.

In the rolling mill, the rough pierced hollow, still under observation for maintenance of the proper rolling temperature, is forced into a pair of grooved rolls which regulate the outside diameter of the tube. The inside diameter is regulated by a plug which is held rigidly inside the tube almost directly between the grooved rolls.

Due to the stiffness of the steel, even at high



Corrosion-resisting seamless steel tubing of the Nirosta KA2 or chrome-nickel variety conveys pineapple juice from the fruit to the container in modern canning factories

temperatures, the piercing and rolling operations are slow as compared with similar operations on ordinary carbon steel. The inner and outer surfaces of the tube are smoothed by passing it through the reeling machine which consists of two long rolls rotating in the same direction, which engage the tube on its two sides, forcing it forward spirally over a smooth plug supported by a thrust bar.

As almost all these operations are performed over plugs supported by bars in compression, Nirosta KA2 tubes cannot be made commercially and finished by this process in sizes below about 2½-inch outside diameter, except in short lengths.

Sizes down to 2-inch outside diameter may be produced by passing tubes from the reeling machine through a continuous reheating furnace and then through a continuous reducing mill which consists of a large number of pairs of grooved rolls set in tandem and arranged so that each succeeding pair of rolls makes a reduction in the outside diameter of the tube. No plug is used during this operation and, consequently, the walls cannot be thinned or closely controlled as in the preceding operations.

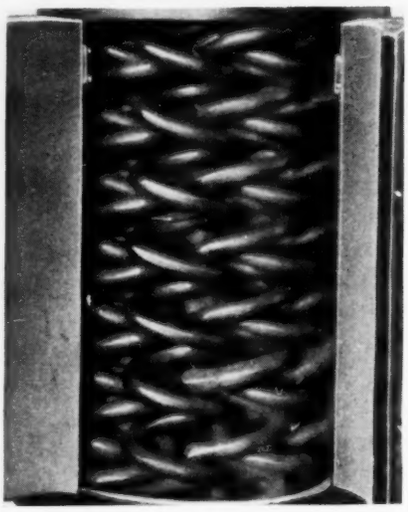
Smaller Tubes Drawn

Thus far, all tubes finished by the operations listed have been fabricated while hot and hence are known as "hot finished" tubes. Tubes outside the range of sizes of the hot finished group, that is, tubes smaller than 2-inch outside diameter or of large outside diameter but having a thin wall, may be completed by cold drawing, or performing all operations on the tube while it is at room temperature.

In cold drawing, the tube is pulled, simultaneously, through a hollow circular die and over a bar mandrel which is held rigidly in the center of the die. Before the cold drawing operation, the steel is annealed by heating it rapidly to a temperature between 1850 and 2150 degrees Fahr., care being taken that the heating is even and thorough. Cooling should be done as rapidly as possible, either by air or water quenching, preferably the latter.

As the tubing must be scale free before being cold drawn, it is pickled in a 50 per cent solution of hydrochloric acid at a temperature of approximately 175 degrees Fahr.

The high tensile strength and the property of rapidly work-hardening of the steel at room temperature makes it imperative that only a small reduction in diameter or slight thinning of the wall be accomplished by each cold-drawn pass; consequently, the smaller the diameter and wall thickness of the tube desired, the greater will be the number of cold-draw passes required to accomplish this and, as the tube must be heat treated and pickled prior to each pass, a corresponding number of heat treatments and picklings is necessary to fabricate the tube completely.



Instantaneous water heater equipped with coils of seamless 18 *and* 8 *steel*

Close temperature regulation during piercing, rolling and heat treating gives the finished tube uniform physical properties. A series of minute inspections, appropriate to products of such value, is made at several stages in the manufacturing process.

The designer of apparatus requiring alloy tubes and pipe has a complete range of sizes from which to draw. In pipe, the entire range up to 6-inch iron pipe size is available. In tubing, where sizes are always designated by exact outside diameter and wall thickness, Nirosta KA2 can be obtained up to 6⅝-inch outside diameter, and in wall thicknesses from about 0.035-inch or 20-gage in the smaller sizes, to 0.75-inch in the larger sizes.

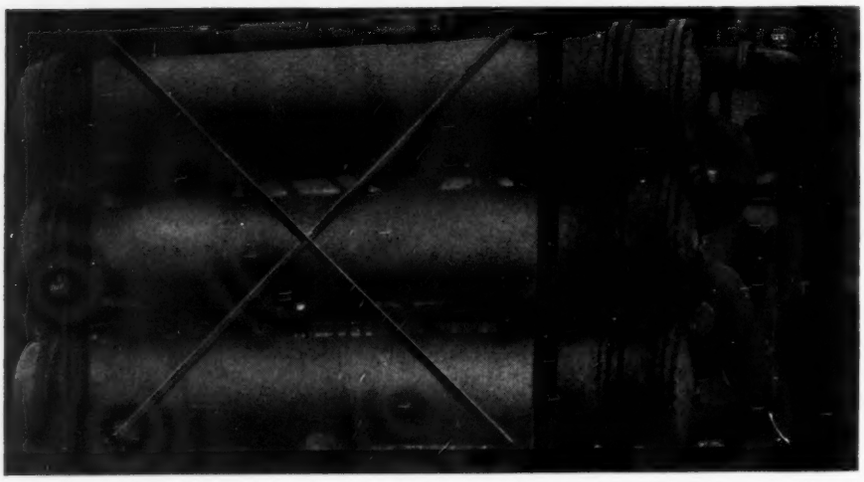
Every effort is being expended to make possible the production of seamless chrome-nickel steel tubes of diameters larger than those listed above and it is hoped that, in a comparatively short period of time, it will be possible to satisfy the growing demand for large size tubes. Centrifugally cast tubes and pipe are already production articles and are entirely satisfactory, when too thin a wall is not required.

Tolerances Are Permitted

In regard to designating sizes of tubing, it is not generally understood that, while the designer's calculations indicate certain exact dimensions for outside diameter and wall thickness, these sizes are not available without some variations known as "necessary manufacturing tolerances." The ideal tube, of course, conforms to exact dimensions and, in commercial production, this is the goal sought; however, some variations from exact dimensions are required and the customer should specify the type of tolerances he desires to apply on his tubes, this to depend on the future service for which they are intended. The average cold drawn tube is made to "mechanical specifications," and the weight of such a tube is generally about the theoretical weight but, in order to obtain this weight, the manufacturer is allowed plus and minus tolerances on wall thickness and outside diameter and, in addition, a certain allowable ovality. The American Society of Mechanical Engineers specification allows nothing thinner but does allow a thicker wall than specified. This leads to an actual tube weight greater than the theoretical weight.

Although this alloy carries the general designation of Nirosta KA2, there is a subclassification known as Nirosta KA2-S. The two are identical in all respects excepting the carbon content which is less than 0.16 per cent for KA2 and 0.07 per cent maximum for KA2-S. The former, when properly heat treated is suitable for general corrosion service where the temperature does not exceed 600 degrees Fahr.

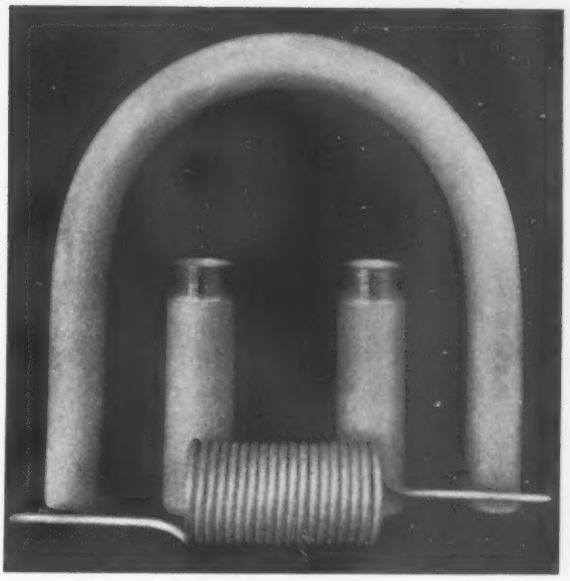
It has been found that at high temperatures carbide precipitation occurs which affects both the physical



Vapor condenser built for a prominent eastern refinery, equipped with seamless Nirosta KA2 tubes

properties of the material and its corrosion resistance to a degree governed by the carbon content. This change takes place regardless of previous heat treatments; therefore, it is quite necessary to limit the carbon content to a maximum of 0.07 per cent when the alloy is to be used at temperatures where carbide precipitation occurs.

In determining tensile properties of Nirosta KA2 tubes, test pieces have been taken from large numbers of tubes. In some cases, full tube sections have been tested and in others tests have been made on strips cut from tubes. Wide variations in properties have been obtained and the figures shown in the accompanying table are minimum values which always can be realized and, in most tubes, higher values can be expected.



EXAMPLES of bent and threaded seamless chrome-nickel steel tubing. In the foreground is a small coil of the same material, 5/16-inch outside diameter

Shaped Without Heating

The chrome-nickel steel when properly heat treated, is tough and ductile at room temperatures. Usual operations connected with the installation of tubes and pipe such as expanding, rolling, belling, flanging and bending to usual commercial radii can be done without any preheating.

Arc welds should be made with coated Nirosta KA2 electrodes. Welding may be done with either alternating or direct current. With direct current, the polarity should be reversed from that in ordinary steel welding practice; that is, the electrode should be the positive and the work the negative terminal. The voltage required varies with the wall thickness of the tube to be welded and should be as low as practicable, ranging between 40 and 60 volts measured at the welding machine. The current should be between 75 and 125 amperes.

The maintenance of a close arc and an uninterrupted flow of the metal being deposited are important. On thickness of 3/16-inch or lighter, no beveling of the material at the joint will be required. Above 3/16-inch, the joint should be beveled and the metal laid in two layers. Where successive layers of material are to be deposited, the weld material of the preceding bead should be allowed to cool thoroughly before the next bead is deposited.

Wherever possible, the metal deposit should be laid down in a continuous stream. At the end of the bead, the arc should be wiped off the work so that no detrimental crater will be formed. Having no capacity for hardening by temperature effects, welds remain tough and ductile and do not develop the coarse, crystalline structure characteristic of the straight iron-chromium alloys.

In acetylene welding, uncoated rods should be used as filler material. The flame should be soft neutral or slightly reducing. The torch should be kept pointed in the direction of the work to preheat the parts to be welded, and the rod should be kept in the flame. The deposition of the weld metal should not be gone over with the flame or puddled. Such reheating or puddling may leave the metal porous.

For upsetting, Van Stoning, or similar operations on Nirosta KA2 the tube ends should be heated rapidly and uniformly to a temperature of 1900 to 2200 degrees Fahr. and finished between these temperatures. If forging is done at a temperature below 1850 degrees Fahr., the metal hardens and must subsequently be heat treated. The metal may be softened by rapid heating to a temperature between 1850 and 2150 degrees Fahr., care being taken that the heating is even and thorough. Cooling may be done by rapid air cooling or by quenching in water, preferably the latter.

Removal of scale is accomplished satisfactorily by pickling in a 50 per cent solution of hydrochloric acid at a temperature between 160 and 200 degrees Fahr. Where such acid is not available, a hot solution of 10 per cent (by weight) of sulphuric acid and 6 to 12 per cent of rock salt should be used. The addition to the rock salt liberates hydrochloric acid and effects a 50 per cent saving in time over a straight sulphuric acid pickle. It is also possible to substitute a small amount of hydrochloric acid for the rock salt in pickle solution above. After pickling, the material should be dipped in a hot, minimum 10 per cent solution of nitric acid and then thoroughly washed in hot water.

Difficult To Machine

Being an austenitic alloy, Nirosta KA2 is somewhat difficult to machine. Best results are obtained with slow cutting speeds and moderately heavy cuts. Tools should be ground and kept sharp and with a steep side and lip rake, at least 15 degrees. In threading, four or five teeth should engage instead of two or three.

With the usual methods of soldering or brazing, heating the tubes and then applying the solder or the spelter causes it to penetrate into the metal, thus weakening the structure of the tube and making it liable to failure under pressure. In most cases, where soldering or brazing may be considered, welding can be substituted safely and satisfactorily.

Grinding preferably should be done wet, care being observed that the metal does not become unduly heated lest the corrosion-resisting properties of the area be impaired because of scorching. A freshly dressed wheel should be used so that

(*Concluded on Page 52*)

Physical Properties of Nirosta KA2 Tubes

	Hot finished	Cold drawn
Ultimate tensile strength, pounds per square inch	85,000	75,000
Yield point, pounds per square inch	28,000	25,000
Proportional limit, pounds per square inch	16,100	16,100
Elongation in 2 inches, per cent	50	55
Elongation in 8 inches, per cent	35	38
Reduction of area, per cent	45	*
Hardness, brinell	125	120
Hardness, Rockwell	B-73	B-62

*In general, sizes are too small to make accurate determination of reduction of area.

Courtesy Lincoln Electric Co.

WELDED building construction, accepted generally as practicable and safe, has not yet been practiced by enough contractors to establish commercially its cost-saving advantages. One consulting engineer's viewpoint on welded structures is presented in the accompanying article, a paper read before the recent welding conference at Case School of Applied Science, Cleveland,[1] a two-day meeting arranged by the college with the co-operation of the Cleveland Engineering society. The author, Gilbert D. Fish, is consulting structural engineer, Westinghouse Electric & Mfg. Co., New York.

A Consulting Engineer Looks at Structural Welding

BY GILBERT D. FISH
Westinghouse Electric & Mfg. Co.

IT IS common knowledge that buildings and other steel-frame structures have been arc-welded extensively, and that the method is practicable and safe in the hands of experienced organizations. A large proportion, perhaps a majority, of engineers and contractors as yet regard welded construction as appropriate for companies interested in welding for some special reason connected with their business or on account of its quietness. It is a fairly common belief that welding a building instead of riveting it costs a little extra money and puts the engineer and the steel contractor to extra trouble.

Welded building construction has not yet been practiced by enough contractors or in sufficient volume to establish commercially its costs saving advantages. From the standpoint of the buyer, relative cost means relative price as quoted by contractors. Quotations on welded buildings are still erratic, except where the engineering plans and the letting of contracts are handled or guided by experienced engineers.

As it is too soon for general competition to yield other than misleading information as to cost relationships between welding and riveting, real insight requires study of the elements of design and of unit costs. A well designed welded structure generally employs somewhat less steel than it would require if riveted; shop operations such as cutting and punching are reduced for most members and eliminated for others; hoisting and setting labor is nearly unchanged; and welding, if not in excessive amount, requires fewer hours of labor than the riveting which it replaces. Anyone who has had enough experience in welded construction to know these facts at first hand, is not to be shaken from his belief in its economy by instances of high bids or actual high costs of unskillfully planned welded structures.

A truly competitive situation, in which many steel contractors estimate with fair accuracy the cost of efficient construction by the welding method, has not arrived. When it does, the public will find that welded buildings cost somewhat less than riveted ones. In the meantime, those who know how to go about it will continue to buy welded construction at a price saving; others will in many cases pay a premium for its use.

It is not to be expected that most of the engineers who design buildings will spend much time learning welded construction until they find it necessary. Thus far, relatively few owners have insisted on having their buildings welded; many others have been interested enough to inquire about the possibilities, but in numerous cases have been deterred by noncommittal or skeptical reports from consulting engineers or contractors.

Unbiased Information Sought

In attempting to obtain unbiased information, prospective purchasers or builders of welded structures have all too often sought the advice of individuals or groups who were in no way identified with welding and who, therefore, knew little or nothing about the subject.

The time is not far off when engineers who consult on steel construction will have to handle welded work whether they prefer it or not, or else lose standing. At the present time those who do not like to be troubled with new methods can disregard welding in most cases without embarrassment, because riveting is admittedly the prevailing means for joining structural steel and few clients insist on departing from it. This condition will not endure many years longer, and only the less farsighted among consulting engineers will long postpone familiarizing themselves with the principles of economical planning and effective

supervision of welded construction.

Framing plans for a welded building usually closely resemble the plans which would be used for riveted construction, except in the composition of trusses, plate girders and other built-up members. In an ordinary tier building, lacking roof trusses and employing single rolled shapes for all members, the design may be the same for welding as for riveting, except the connection details. In framing of the simple beam-and-column type, welding does not permit saving of material in the members unless continuous beam construction is used; this sometimes results in net saving of cost, but only under certain conditions.

Welded plate girders are somewhat easier to design than riveted ones. They are generally made of plates only, and contain no holes. Their effective depth is greater for a given overall dimension because flange plates are further from the neutral axis than flange angles, and the absence of holes avoids reduction of effective tension flange area. Stiffener plates are much lighter than angles used in riveted girders, and filler plates are not needed at stiffeners because there are no flange angles. Welded girders are usually 10 to 20 per cent lighter than riveted ones designed for the same total depth, span, loading and unit stresses, and are actually somewhat stronger due to thicker and better braced compression flanges.

Gusset Plates Eliminated

Welded roof trusses differ from riveted ones chiefly in the omission of gusset plates, made possible by the compactness of welded connections. Another weight-saving difference is the elimination of rivet holes, which in riveted trusses increase the cross section requirements of tension members. Weight savings in economical but safe welded trusses are usually between 20 and 30 per cent.

Numerous specialties occurring in various types of building respond to steel-saving properties of welded assembly. Crane girders, crane rail brackets, cantilever balconies, hanging mezzanines, built-up spandrels and lintels, steel plate floors, bins, roof signs, marquees and numerous assemblies not involved in ordinary floor framing, are responsive to the advantages offered by welding.

Highway and railway bridges ought, for reasons of economy, to be of welded rather than riveted construction. Only a few all-welded bridges have thus far been built, because the companies which offered the early opportunities to weld buildings in the interests of the welding industry have not needed many bridges for their own use, and because there has been greater reluctance on the part of engineers to sanction a new method for bridge service than for buildings. However, welding has been used for several new bridges and for a large number of bridge reinforcement operations; it has been notably effective and economical in reclaiming and strengthening old viaducts and elevated railways under traffic, and for temporary and permanent street supports over tunnels and subways.

In any kind of reinforcement or alteration work, welding offers pronounced cost savings because of the ease with which new steel can be attached to old without drilling holes. The economy of welding for such work is so obvious and so generally admitted that there is a tendency to over-emphasize its suitability for special purposes and overlook its advantages in ordinary construction.

In planning welded construction, a designing engineer experienced in

riveted but not in welded work can make creditable framing plans if he has familiarized himself with the main distinguishing features of welded connections as described in numerous articles in the technical press. In ordinary tier building design the beams and columns may be arranged and designed without much if any reference to the use of welding in place of riveting; in trussed roofs, special framing and alteration work in buildings, and in any sort of bridge construction, a fair knowledge of welding design is necessary to achieve practical and economical plans.

The part of the engineering which demands the most experience and skill is the designing of the welded connections. In riveted work there are relatively few suitable connection forms, and these have to a great extent been standardized; it has been customary for steel contractors rather than consulting engineers to furnish the final details or shop drawings for riveted framing. This procedure is frequently followed in welding practice, but under present conditions causes erratic bidding and high prices unless typical connections are designed sufficiently in advance and shown on the estimating plans to permit accurate predetermination of the quantities of shop fabrication, shop welding and field welding.

Skillful planning of welded connections depends on far more than knowledge of safe forms and of allowable unit stresses. Rather brief study suffices to acquaint a structural engineer with accepted methods of calculating the working strength of any ordinary welded joint. On the other hand, considerable ingenuity and practical experience are valuable, not to say necessary, in devising or selecting joints which not only are economical of material and welding labor but also eliminate fabrication to the utmost and provide for quick accurate erection.

Although numerous actual joints have been illustrated in articles about welded structures, no general treatment of the subject has been attempted in any work thus far published. Of course, weld forms have been classified, and the few forms commonly employed in construction work are as definitely standardized as the forms of rivets and bolts. On the other hand, useful combinations of welds with connection parts are remarkably numerous and widely varied; as the factors on which economy depends vary with the jobs, standardization will have to embrace many types to permit advantageous design.

Factors Govern Economy

Among the principal considerations for economy in joints are the following:

1. Members should be joined through connection pieces, unless they lap, because it is too expensive to cut them to exact length.

2. Provision should be made for temporary support during erection, by bolts or clamps; connections cannot be detailed intelligently without planning how this is to be done.

3. Provision should be made for correct spacing of members during erection; it is generally wise to weld connection pieces to some of the members before erection, to serve as spacers.

4. In many structures it is practicable to use a substantial proportion of unfabricated material; with this in view, it is well to plan the connections so that necessary fabrication shall be concentrated in certain classes of members, completely eliminating preparatory work from as many as possible of the large pieces. If erection bolts are to be used, all the holes should occur in a minority of the main members and in connection pieces.

5. Erection seats should be provided for all beams, except perhaps

(*Concluded on Page* 38)

Fig. 1—Scarfing low-carbon steel with oxyacetylene equipment of the portable type. Only a few seconds are required to surface the billet

Scarfing Process Is Effective in Eliminating Defects

BY J. D. KNOX
Associate Editor, STEEL

REMOVING defects such as seams, scabs, scratches, etc. from the surface of billets, slabs and other semifinished shapes before the stock runs the gamut of finishing mill rolls greatly minimizes the quantity of steel passing into discard. Usually these defects are removed by air-operated chipping hammers, by grinding or by a milling machine. A recent addition to the means employed is by scarfing the surface with scarfing torches which are akin to but different from the ordinary cutting torch.

Fig. 1 shows a soft steel billet being scarfed with equipment of the portable type. The sweep of the flame at a temperature of about 6000 degrees Fahr. lengthwise of the billet required about 8 seconds including the starting time. The scarf left by the torch in one passage over the surface of the steel is shown in Fig. 3.

Defects Removed Quickly

At a steel plant in Ohio, scarfs 7/8 to 1 inch wide, are being made lengthwise on soft steel billets at the rate of 6 feet in 20 seconds. The rate and manner in which oxygen is fed to steel in the scarfing process varies depending upon the grade of metal; the quantity of oxygen required is influenced by the composition of the steel. More oxygen is necessary to surface some steels than others. In scarfing either basic or bessemer low-carbon 4 x 4-inch billets of 160 pounds and 60 inches long, and, 5 x 3¼ to 16 x 2½-inch slabs of the same length, one tank or 120 cubic feet of oxygen is sufficient for 3 tons of steel and a tank of acetylene for 60 tons of steel, based on consumption data covering several months scarfing operation.

Formerly 30 men working 10 hours a day were employed in chipping 2000 to 2500 tons of billets a month but since the inauguration of scarfing, the same tonnage is being surfaced by a crew of 13 men working from 5 to 9 hours a day. Moreover, the surfacing charge has been reduced $0.97 a ton. During the summer months the saving between chipping and scarfing amounted to $1.31 a ton in favor of the latter method.

Rejections Are Minimized

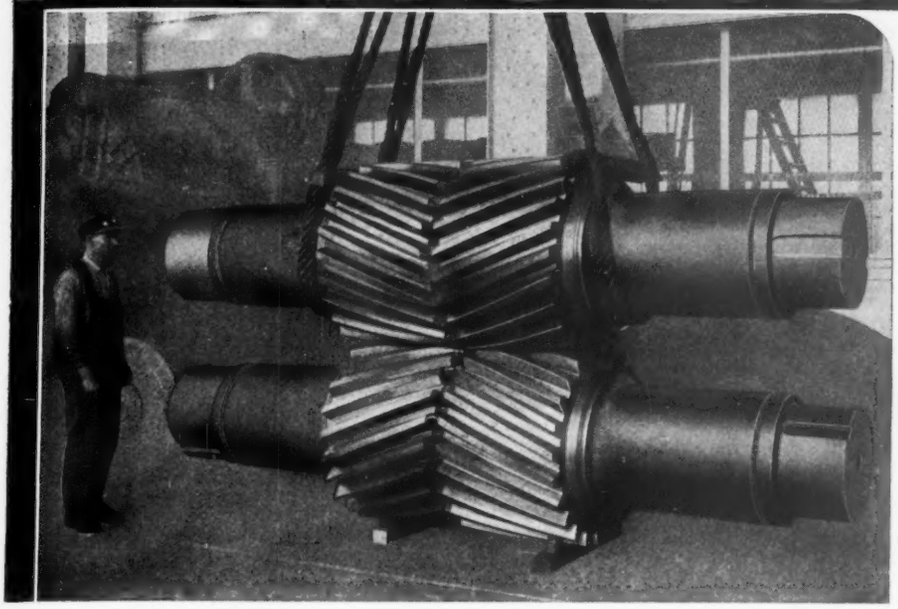
Covering a 3-year period, 11.2 per cent of the steel which reached the chipping bed was discarded as scrap whereas but 3.6 per cent reaching the scarfing station is discarded, thus effecting a saving of 7.6 per cent in the quantity of steel relegated to the scrap pile.

While the supply of oxygen may be obtained from a single container it is more economical to manifold the supply of several cylinders through one common outlet. The time required for changing the outlet connections from a discharged tank to a full tank amounts to several hours on an annual basis. At one plant where a central control or manifold system was substituted for a portable unit, the saving was found to be $0.40 a cylinder or $0.67 a day for each operator.

The manifold system in its entirety

Fig. 2—Floor-type manifold equipped with multistage regulators for reducing the cylinder pressure of the gas to the desired working pressure

MILL PINIONS . . . .



To withstand the extremely heavy and intermittent tooth loads encountered, accurately cut teeth are essential for long life in Rolling Mill Pinions. The result is smooth and quiet running, producing a finer finished product.

Mesta Cut Tooth Mill Pinions have accurate teeth with bearing across the entire face and are free from excessive backlash with both extremely large and fine pitch.

Double Helical
Single Helical
Straight Spur
Carbon Steel or Alloy Steel
Forged or Cast Steel
Planed tooth or Hobbed tooth
Any Size

MESTA MACHINE COMPANY—Pittsburgh, Pa.

Mesta

contributed a saving of approximately $11,000 annually, according to operating reports. A 20-tank central control unit is shown in Fig. 2. Under operating conditions when the supply of oxygen from 10 of the tanks is exhausted, the gas from the remaining 10 cylinders is turned into the manifold and fed to the torch. Meanwhile, the 10 exhausted tanks are replaced with fully-charged units, thus affording a continuous supply of oxygen at all times and eliminating lost time which arises as a result of tank replacement.

Pressure Is Controlled

One of the important adjuncts of the scarfing equipment is the regulator. Its function is to pass gas from the manifold to the torch at some predetermined pressure and to maintain the gas flow at that pressure constantly and without variation. The pressure of the oxygen at the manifold ranges from 2000 to 2500 pounds per square inch while the desired working pressure at the tip of the torch varies between 2 and 50 pounds per square inch.

A unit built by the Harris Calorific Co., Cleveland, steps the pressure down to within a working range through a 2-stage control. The first stage takes the long drop from the manifold pressure down to a constant subpressure from whence the gas is passed at such reduced pressure to the second stage and thence to the torch. One of the advantages of this type construction is the use of proper seats of different characters, each designed for a specific function to insure the correct flame at the torch. A regulator of this type will handle 10,000 cubic feet of oxygen per turn of eight hours without undue attention.

Consulting Engineer Looks at Structural Welding

(*Concluded from Page* 35)

small ones. Usually, it is economical to make such seat connections the main supports for the beams, avoiding the need for web connections.

6. Fillet welds larger than ⅜-inch size require more labor per ton of strength than smaller ones, and should be used only when there is too little room for the required length of smaller welds.

7. While connection members are usually necessary for economy, they should not be multiplied needlessly; their weight is appreciable and their preparation and handling make them relatively expensive per pound.

8. Welds should not be located in inaccessible corners, and should not be in positions requiring overhead work except in cases of strict necessity.

9. As field work generally is done without scaffolding, field welds so located as to require special supports

Fig. 3—Typical scarf made with oxy-acetylene on the surface of a 4 x 4-inch billet of low-carbon steel

for the operators are undesirable.

It has sometimes been said that, for an engineer familiar with riveted steel structures, there is nothing to be learned about designing welded ones except the allowable load on 1-inch of ⅜-inch fillet weld. Even allowing for the intention to convey a broad idea subject to minor inaccuracies, the thought expressed is highly misleading. Inexpertly planned welded structures which have cost more than riveted equivalents have presumably been correctly designed as to basic unit stresses. There is no fundamentally important reason for welding except economy, and knowledge insufficient to attain economy must be considered inadequate. Furthermore, there are certain dangers of weakness in design which are not safeguarded by experience in designing riveted structures or by knowledge of allowable stresses in welds.

Secondary Bending Stress

One pitfall is secondary bending stress in inflexible beam connections. Web connections, and seat connections combined with top flange bracing, are subject to such stresses and must be designed with definite precautions. Another danger, usually unimportant except in tension connections, is residual stress caused by restraint of shrinkage of weld metal immediately after deposition; it is quite possible to guard against trouble from this source, but familiarity with riveted construction is no protection in these cases.

Proper supervision and inspection are known to be adequate safeguards of the quality of welding, even where the welding force must be recruited in the open labor market. Careful selection of welders before employment is nevertheless essential. From the consulting engineer's standpoint, this procedure control, however important, does not require a great deal of professional attention. The supposedly paramount importance of this phase appears to have been overemphasized. In actual practice, a welding organization which has settled down to a well regulated routine with systematic inspection turns out work which is fully as uniform and dependable as the familiar structural riveting in which engineers repose such confidence. If presently some vital part of a welded structure lets go, spoiling the very clean record which has been established in these early years, it will most likely be due to improper joint design.

Electrical Engineers Will Meet in Cleveland

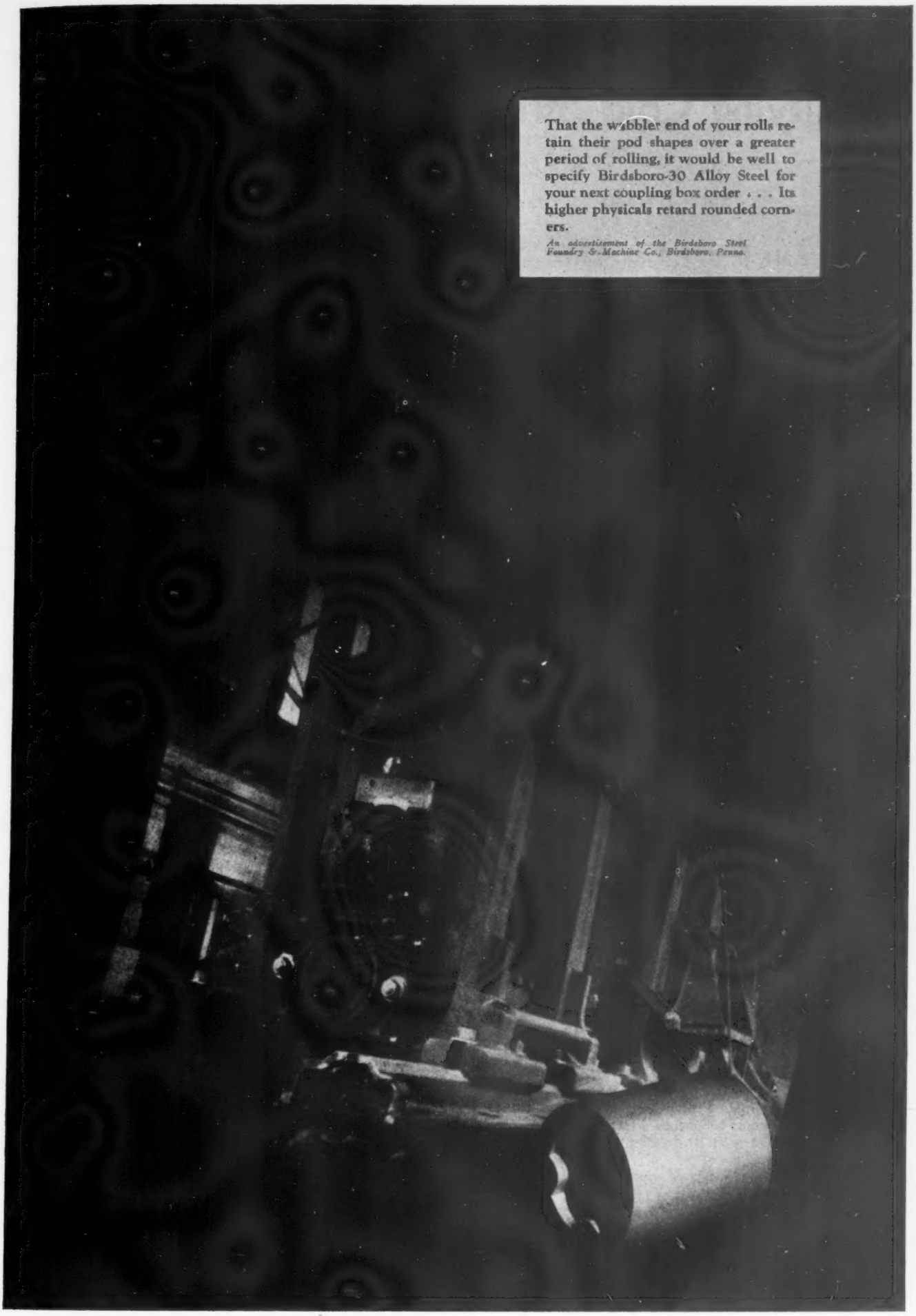
Electrical engineers gathered at Pittsburgh March 11-13 for a joint meeting of the Middle Eastern district of the American Institute of Electrical Engineers and the Association of Iron and Steel Electrical Engineers. The program of the three-day session included the presentation of a number of technical papers and inspection trips to various plants in the Pittsburgh district. At a meeting of the board of directors of the American Institute of Electrical Engineers, Cleveland was selected for the annual convention in June, 1932. The 1931 convention will be held in Asheville, N. C., June 22.

Outlines Requirements of Arc Welding Contest

Lincoln Electric Co., Cleveland, has prepared an 8-page folder outlining the purpose, mandatory regulations and other pertinent information concerning the second arc welding prize competition which the company is sponsoring. Cash prizes totaling $17,500 are to be awarded for the forty-one best manuscripts submitted. Copies of the folder may be obtained by addressing the Lincoln company.

Metal Trades Group Meet

The twenty-fifth annual meeting of the Indianapolis branch of the National Metal Trades association will be held March 26 at the Columbia club, Indianapolis. Dr. Otto P. Geier, Cincinnati Milling Machine Co., Cincinnati, will speak on "Employers' Responsibility to Modern Management." J. E. Nyhan, executive secretary of the metal trades organization, will talk on "Industrial Stabilization in the Metal Trades."


That the wabbler end of your rolls retain their pod shapes over a greater period of rolling, it would be well to specify Birdsboro-30 Alloy Steel for your next coupling box order . . . Its higher physicals retard rounded corners.
An advertisement of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Penna.

Physical Values Assist in Specifying Cold Strip

BY JOSEPH S. ADELSON
Steel & Tubes Inc., Cleveland

Part II

MENTION has been made that at times the hot strip width is a multiple of the finished cold strip width. The strip can be sheared or slit into several strands if wider hot strip is used. The same type of shearing operation is used if strip accurate in width is desired. The tests were confined to the narrower single widths, varying from 3 to 6 inches, because there is greater possibility of variation in thickness from center to edge of the strip in the wider widths. Analyses and sizes of the hot strip used are given in Table I.

Heavier hot strip than was necessary for the finished gage was used for lots D and E to obtain data on heavier reductions of the hot strip and also to be certain that the metal was sufficiently soft because hot strip in the lighter gages is often harder than in the heavier gages. The use of these heavier gages had no affect on the rollings after annealing.

Table II contains complete information on the amount of reduction per pass both in thousandths of an inch and in percentages. All graphs and charts are based upon the figures tabulated. Olsen and Erichsen readings were taken on the lighter gages only because the machines available were not adapted to the testing of the heavier gages. However, sufficient data was obtained for the purpose of this investigation because of the interest in the lighter gages.

Avoids Erratic Values

The thin specimens were not subjected to brinell tests because even a load of 500 kilograms results in an impression which penetrates the entire thickness of the strip and therefore gives erratic readings because of the anvil reaction. A sufficient number of readings were taken on the heavier specimens to secure an accurate comparison with the other methods of testing.

The Rockwell impressions also penetrated the entire thickness of the metal on specimens thinner than 0.020-inch even though the strip was hard, and the readings may not be absolutely accurate.

Vickers readings were taken on a few of the specimens only, primarily for conversion into brinell values for comparison. Both the Vickers figures and the converted brinells are included and in every case these latter were considerably higher than the results of the brinell machine. This in all probability is due to the fact that the lightest load (10 kilograms) was used in the Vickers test so that only surface hardness was determined whereas the brinell impression in every case penetrated the hard skin. Insufficient information was obtained on the Vickers tests to include them in the charts and they are listed here as matter of interest only. Attention is here called to the fact that Vickers results decrease with increasing hardness whereas the reverse is true in all the other tests.

COMPARABLE data on the physical characteristics of cold-rolled strip steel, as determined by various types of testing machines, frequently are helpful in compiling specifications. In the accompanying article, the second and concluding installment, Joseph S. Adelson, metallurgical engineer, Steel & Tubes Inc., Cleveland, submits physical values representative of commercial tempers and based upon tests of low-carbon product.

The 90-degree bend test was a sharp right angle bend and the strip was flattened upon itself in the 180-degree bend. None of the specimens fractured in the 90-degree bend across the grain. The tests have been divided into three classes, those showing slight cracks, severe cracks, and specimens which broke in two. Bend tests are valuable in determining temper of the steel but are not an accurate indication of the hardness. As a rule cracks developed in the rollings before annealing with approximately the same percentage reduction as after annealing. An investigation made to determine this particular point, results of which are not included here, seemed to indicate that a heavier reduction is necessary on the hot strip rolling than on the rolling after annealing to cause cracks to appear.

The Herbert pendulum test results check the hardness readings obtained on the other machines. They have not been used in the compilation of the curves as the test is not universally used. The range of figures which covers the limits of hardness in rolled strip is comparatively narrow in this method of testing.

Scleroscope results are included because the test is widely used, mostly as a check in testing strip steel. In this test also the difference in readings between hard and soft material is small.

All coils were annealed twice to insure maximum softness, but the results indicate that the softest possible steel was obtained in the first anneal. Any variation is within the limits of experimental error in making the tests.

Texture Becomes Hard

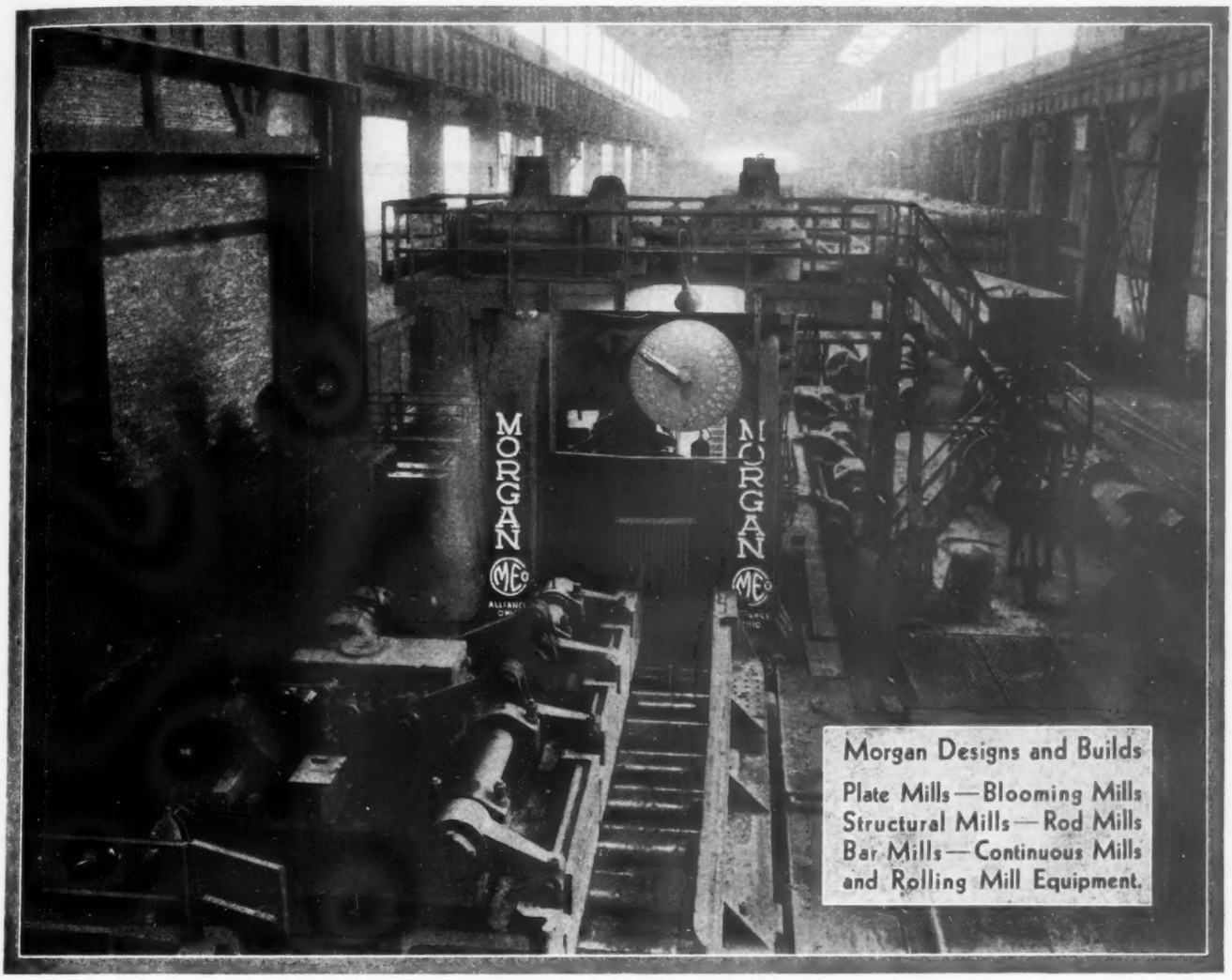
Increase in hardness is rapid until a reduction of about 30 per cent is reached when the hardness begins to approach a maximum. (Percentage reduction is figured from the starting gage, hot strip for the first rollings and annealed strip for the second series.) The order of increase in hardness is demonstrated more clearly in Fig. 3. A departure from the uniform or rather progressive increase as seen in the curve appears to have occurred in some of the specimens. In lot A for example, a reduction of 7.5 per cent from A-11 to A-12 resulted in an increase of only one point in Rockwell, 83.5

Table I

Width, Gage and Analyses of Strip Tested

Lot No.	Size, inches	Carbon, per cent	Manganese, per cent	Phosphorus, per cent	Sulphur, per cent	Silicon, per cent
A	5¼ x 0.137	0.08	0.39	0.012	0.036	0.008
B	5 x 0.108	0.09	0.43	0.015	0.042	0.012
C	5⅜ x 0.083	0.10	0.41	0.018	0.049	0.010
D	5 x 0.083	0.08	0.42	0.015	0.036	0.010
E	3½ x 0.078	0.12	0.47	0.012	0.042	0.012

MORGAN 54" BLOOMING MILL



54" Blooming Mill—Designed and Built By Morgan

Mill housings are one-piece steel castings—assuring extreme rigidity.

Two cylinder roll balance is used, thus requiring minimum head room.

Manipulator is of the overhead type, compact and simple. Finger lifts and side guards are each operated by two motors in series—assuring very quick acceleration.

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to 84.5, and yet the pass immediately following, A-12 to A-13 with a reduction of only 6.7 per cent increased the Rockwell 4.5 points, from 84.5 to 89. The next pass, A-13 to A-14 with a reduction of 6.5 per cent again increased the Rockwell only one point. The same apparent discrepancies can be found in specimens B-11, 12, 13 and 14. Subsequent investigation proved that this peculiar variation is due to the age-hardening of the metal. All the rollings through specimens of the "12" series had been done consecutively with intervals of not more than several days.

Produced Little Hardness

Specimens of the "11" series had approached the maximum and the additional rolling in "12" had little effect toward increasing the hardness. A considerable time elapsed before rollings "13" and "14" were done and the strip had ample time to age-harden. Rollings "13" and "14" were done in one day and as expected, "14" showed practically no increase in hardness over "13", because "13" was obviously close to the maximum. Undoubtedly "14" would have shown a larger increase if a little time had elapsed between the "13" and "14" rollings. Tests made on "11" and "12" after they

Table II

Amount of Reduction Per Pass and Test Results

Sample No.	Gage, inches	Total passes	Reduction: Per pass, inches	Reduction: Total, inches	Reduction: Per cent	Olsen	Erichsen	Rockwell	Sclero-scope	Brinell	Vickers-Brinell		Herbert	Bend 180 degrees across	Bend 90 degrees with	Bend 180 degrees with
"A" Series																
*H. S.	.137	....	....	....	....	....	....	54	18	64.6	210	105	19.7	O. K.	O. K.	O. K.
A-2	.100	1	.037	.037	27.0	....	....	85	30	143	163	174	22.6	"	Slight	Broke
3	.088	2	.012	.049	35.7	....	....	88	31	158	157	187	24.3	Slight	Cracked	"
4	.083	3	.005	.054	39.7	....	8.7	90	33	163	156	190	23.5	"	"	"
5	.083	Anneal	....	....	....	....	13.6	39	14.5	67	237	83	15.2	O. K.	O. K.	O. K.
6	.083	"	....	....	....	.514	....	39	15	69	270	64	13.9	"	"	"
7	.081	1	.001	.001	1.0	.498	....	48	16	83.8	218	97.4	18.8	"	"	"
8	.074	2	.007	.008	10.0	.427	10.84	70	21	110	179	145	17.7	"	"	"
9	.070	3	.004	.012	15.0	.402	10.60	72	22	129	176	150	21.4	"	"	"
10	.064	4	.006	.018	22.5	.356	9.47	78	25	132	174	153	20.7	"	"	"
11	.058	5	.006	.024	30.0	.325	9.16	83.5	27	...	...		22.7	"	"	Broke
12	.052	6	.006	.030	37.5	.323	9.08	84.5	27	...	...		23.9	"	Crack	"
13	.046	7	.006	.036	43.8	.285	8.10	89	35	...	...		25	"	"	"
14	.041	8	.005	.041	50.0	.218	7.43	90	35	...	...		27	"	"	"
"B" Series																
*H. S.	.108	....	....	....	....	....	....	50	18	79.6	208	107	15.6	O. K.	O. K.	O. K.
2	.086	1	.022	.022	20.3	....	11.4	83	26	143	168	168	24.9	"	"	Crack
3	.072	2	.014	.036	33.3	....	9.15	88	31	156	158	185	23.6	"	"	"
4	.067	3	.005	.041	37.9	....	8.44	90	34	166	152	199	25.1	Slight	Slight	Broke
5	.066	Anneal	....	....	....	.471	12.88	41	15	70	232	86	14.7	O. K.	O. K.	O. K.
6	"	"	....	....	....	.470	12.91	39	14	70	235	84	14.7	"	"	"
7	.0645	1	.0005	.0005	0.8	.457	12.03	48	15	82	218	97	17.8	"	"	"
8	.061	2	.0035	.004	6.1	.411	11.22	64	18	105	185	135	20.1	"	"	"
9	.057	3	.004	.008	12.2	.376	9.62	70	21	119	178	146	20.7	"	"	"
10	.052	4	.005	.013	20.0	.351	8.83	75	22	126	171	158	20.8	"	"	"
11	.045	5	.007	.020	30.8	.310	8.48	85	30	...	...		23.0	"	"	Broke
12	.038	6	.007	.027	41.5	.276	7.01	86	31	...	...		24.0	"	"	"
13	.032	7	.006	.033	50.8	.228	5.86	91	37	...	...		25.0	"	Slight	"
	.027	8	.005	.038	58.2	.210	5.43	92	38	...	...		27.0	"	"	"
"C"																
*H. S.	.087	....	....	....	....	.497	13.90	55	18	79.6	212	102	15.6	O. K.	O. K.	O. K.
2	.068	1	.019	.019	21.9	.334	9.59	86	27	153	159	183	24.1	"	"	Crack
3	.057	2	.011	.030	34.5	.279	8.50	90	30	155	156	188	24.1	"	Slight	Broke
4	.052	3	.005	.035	40.2	.259	7.77	91	30	158	154	195	24.7	Slight	"	"
5	"	Anneal	....	....	....	.430	11.10	49	15	75	222	94	16.2	O. K.	O. K.	O. K.
6	"	"	....	....	....	.428	11.84	48	14	72.5	225	91.6	18.6	"	"	"
7	.051	1	.001	.001	2.0	.430	11.64	46	15	78.4	227	90.8	15.9	"	"	"
8	.047	2	.004	.005	9.6	.403	10.60	62	18	103	196	121	19.3	"	"	"
9	.043	3	.003	.008	15.4	.364	9.04	71	20	119	183	139	20.4	"	"	"
10	.039	4	.005	.013	25.0	.321	8.42	77	22	128	168	164	21.7	"	"	"
11	.034	5	.005	.018	34.6	.288	7.91	84	26	...	...		22.9	"	"	Broke
12	.029	6	.005	.023	44.3	.261	7.22	86	30	...	...		23.7	"	"	"
13	.026	7	.003	.026	50.0	.236	6.56	90	32	...	...		25.0	"	Slight	"
14	.021	8	.005	.031	60.0	.175	5.25	91	33	...	...		26.0	"	"	"
"D" Series																
*H. S.	.085	....	....	....	....	.498	14.35	53	18	68	205	110	18.7	O. K.	O. K.	O. K.
2	.062	1	.023	.023	27.0	.348	9.72	83	24	144	164	172	22.1	"	"	Crack
3	.048	2	.014	.037	43.5	.283	8.28	89	31	158	156	190	24.3	"	Slight	"
4	.043	3	.005	.042	49.4	.262	7.54	91	33	162	154	195	23.7	"	"	"
5	.040	4	.003	.045	53.0	.223	6.96	95	33	190	140	237	26.9	"	Crack	Broke
6	.036	5	.004	.049	57.6	.202	6.63	93	34	186	141	237	27.3	Slight	"	"
7	"	Anneal	....	....	....	.398	11.45	39	15	73	235	84	14.1	O. K.	O. K.	O. K.
8	"	"	....	....	....	.402	11.54	35	14	67	252	73	13.9	"	"	"
9	.036	1	.0005	.0005	1.4	.385	9.73	50	16	87	210	105	17.8	"	"	"
10	.034	2	.0020	.0025	6.9	.373	9.26	59	18	100	196	121	19.1	"	"	"
11	.032	3	.002	.0045	12.5	.347	9.30	64	20	106	191	127	18.8	"	"	"
12	.026	4	.006	.0105	29.0	.297	7.95	77	24	119	173	155	21.1	"	"	Slight
13	.021	5	.005	.0155	43.1	.255	7.18	86	27	...	...		22.0	"	"	Crack
14	.016	6	.005	.0205	56.8	.220	6.32	86	29	...	...		23.0	"	"	"
15	.015	7	.001	.0215	60.0	.186	5.44	89	28	...	...		25.0	"	"	"
16	.012	8	.003	.0245	68.0	.160	5.22	90	29	...	...		26.0	"	"	"
"E" Series																
*H. S.	.078	....	....	....	....	.478	13.42	54	16	83	204	111	18.1	O. K.	O. K.	O. K.
2	.061	1	.015	.015	19.2	.362	9.88	86	27	143	166	168	23.7	"	"	Slight
3	.047	2	.014	.029	38.6	.285	8.20	92	31	160	154	195	27.3	Slight	Slight	Crack
4	.043	3	.004	.033	42.3	.255	7.48	90	30	171	151	203	26.0	"	"	Broke
5	.037	4	.006	.039	50.0	.221	5.43	94	32	182	143	227	28.4	"	"	"
6	.033	5	.004	.043	55.1	.213	5.27	96	33	188	141	233	29.5	"	Crack	"
7	.027	6	.006	.049	63.5	.204	5.09	97	32	...	...		29.0	"	"	"
8	"	Anneal	....	....	....	.395	11.22	40	12	...	...			O. K.	O. K.	O. K.
9	"	"	....	....	....	.396	11.30	44	12	...	...			"	"	"
10	.0265	1	.0005	.0005	1.8	.380	9.69	49	14	...	...			"	"	"
11	.025	2	.0015	.002	7.4	.339	8.62	59	17	100	194	123	20.4	"	"	"
12	.024	3	.001	.003	11.0	.300	7.80	69	19	100	203	112	22.0	"	"	"
13	.019	4	.005	.008	29.6	.246	7.00	81	25	124	163	174	26.0	"	"	"
14	.015	5	.004	.012	44.4	.208	5.81	86	27	...	...		....	"	"	Crack
15	.011	6	.004	.016	59.2	.197	5.55	87	30	...	...		....	"	"	"

*Hot Strip.

had lain for some time showed an increase of 2 to 4 points in Rockwell over the tests made immediately after rolling. This age-hardening phenomenon was not pursued further as a complete analysis would have necessitated an entire repetition of the rollings. No data is available on the limits of hardness possible through age hardening, but the results to date indicate that the increase in hardness is greatest in metal which has been most severely cold worked.

Olsen ductility readings for all specimens taken from the passes on the annealed strip are plotted against actual gage of the specimen in Fig. 1. Each series of rollings is represented by one of the curves, and percentage reduction can be determined for any point on the curves. With the exception of the series "E" curve the general contour is similar. For any one series of rollings

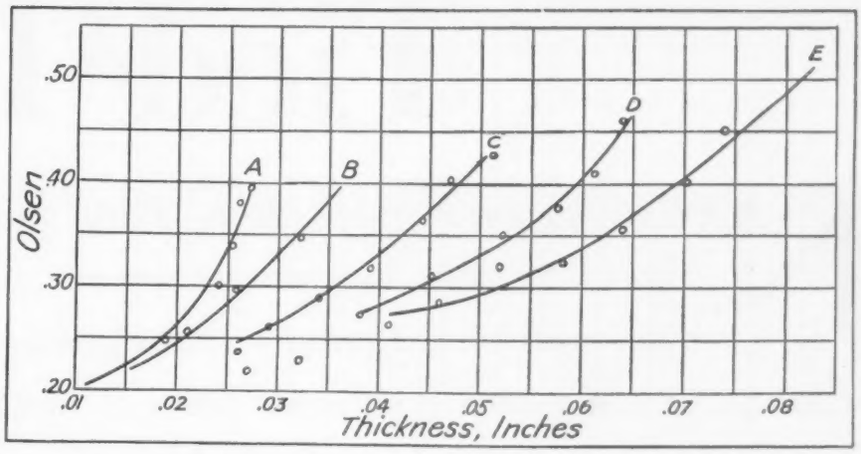

Fig. 1—Ductility of annealed strip plotted against gage of specimen

Table III

Comparison of Readings

Rockwell B	Brinell	Scleroscope
35	65	14
40	71	14
45	78	15
50	84	16
55	91	18
60	98	19
65	106	20
70	115	22
75	124	24
80	134	26
85	147	28
90	163	30
95	186	35
100	216	40

decrease in ductility is practically proportional to decrease in gage with light reductions, but the ductility as measured by a ductility tester gradually approaches a minimum as the percentage reduction increases.

On soft annealed strip of different gages the depth of the cup formed in the ductility test is not in direct ratio to the respective metal thicknesses. However, with a definite percentage reduction on strips of varying gages the ratio of the cups bears a close relationship to the ratio of the cups formed on the annealed strip.

Similar curves are formed by plotting the Erichsen values. The average ratio of Olsen to Erichsen readings on identical specimens was approximately 1 to 2.68, this being for the greater part due to the fact that the Erichsen is read in millimeters and the Olsen in inches.

Both Grades Compared

In Fig. 3 percentage reduction in thickness is plotted against Rockwell B hardness. Two curves are shown, the upper for the cold rolling of the hot strip to the anneal, and the lower covering the cold rolling of the annealed strip. The upper curve uses basic material (the hot strip) which is inherently harder than the box-annealed cold rolled strip used as the starting point for the lower curve. The hot strip averaged 10 points higher in Rockwell than the box-annealed material and that variation is maintained throughout the entire lengths of the two curves. Readings for low reductions on the hot strip were not available for this investigation but previous experience has proven that the curve will have the contour shown for the small reductions. This difference in hardness between the two starting materials is due to the more rapid cooling of the hot strip which produces a slightly harder carbon bearing microscopical constituent in the steel. Cold rolling results in an elongation

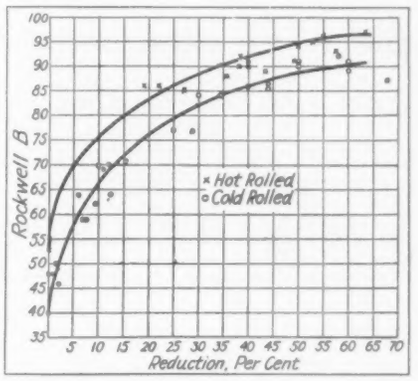

Fig. 3—Per cent of reduction in thickness plotted against hardness values

of the grains in the direction of rolling but this harder constituent remains present.

The rapid increase in hardness when rolling starts and the tendency to approach a maximum is clearly demonstrated in the two curves.

The conversion curve based upon the test results of Table II and showing the relationship between Rockwell, brinell and scleroscope is shown in Fig. 4, and the same comparison is given in actual figures in Table III. The curve is based on the Rockwell and brinell figures but the points for Rockwell-scleroscope also were plotted and it was found that the discrepancy would be no more than one point in the scleroscope. The table is therefore more accurate for the scleroscope. These conversion figures, particularly Rockwell-brinell do not agree with tables published heretofore, it being understood that the results submitted here-

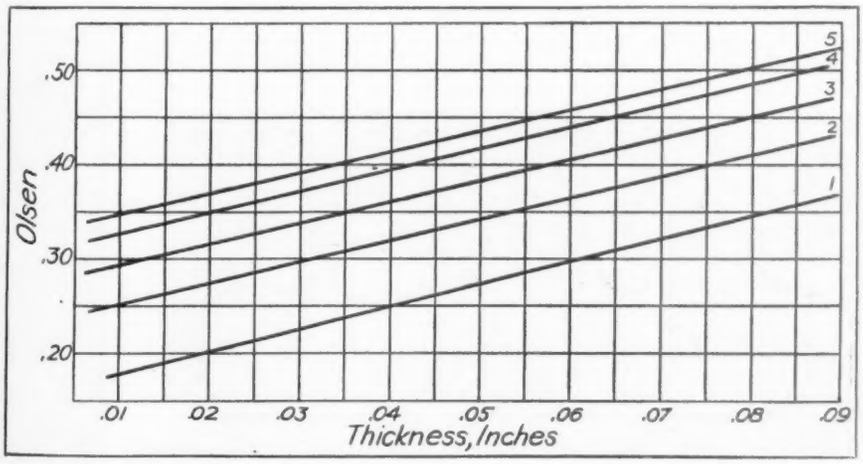

Fig. 2—Relationship between various tempers of cold-rolled low-carbon strip

Tied Hands

NEW days mean new ideas. Parts must be constantly altered to meet new or unforeseen conditions. Assemblies must be frequently redesigned as requirements change. Even entire machines are not immune to sudden, drastic, new demands from the field. Under these conditions any method of manufacturing parts that requires huge and assuredly steady volumes to produce low costs can be very dangerous. For such a method ties a hard, tight knot about the hands responsible for new design; a knot that renders impossible the engineering necessary to keep a machine or piece of equipment at the forefront of its field, in design and resulting sales.

Untying Hands With Sivyer Parts

In this era of constant change, of new models and new lines, of specialized design and intense competition, Sivyer *Cast Steel Parts* untie the hands of designer, manufacturer and sales force.

For *Cast Steel Parts* give these things to light, small, complicated and thin section parts as well as heavier, simpler units:

(1) A simple, inexpensive pattern is the only investment required. A part, an assembly and even an entire machine can be changed more rapidly, more frequently and more inexpensively—to meet ever-changing field demands.

(2) The cost of adding and producing new lines, especially small production lines, is lowered. There is no high investment in dies or other producing equipment to charge off against a few units.

(3) The "bugs" that are constantly being brought to light by changing or unforeseen field conditions can be "licked" fast, before they damage reputation and sales.

(4) A wide range of alloys and heat treatments provides a flexibility of design to meet particular and hard field or manufacturing problems—and these alloys and heat treatments can be used on short productions without involving an excessive premium.

The place that Cast Steel Parts have gained in equipment and machinery manufacture is ably told by the story of what Cast Steel Parts are and do. That story you will find in the latest addition to the Sivyer Library: *Dependability in Steel Castings*. A copy may be had for the asking.

SIVYER STEEL PARTS

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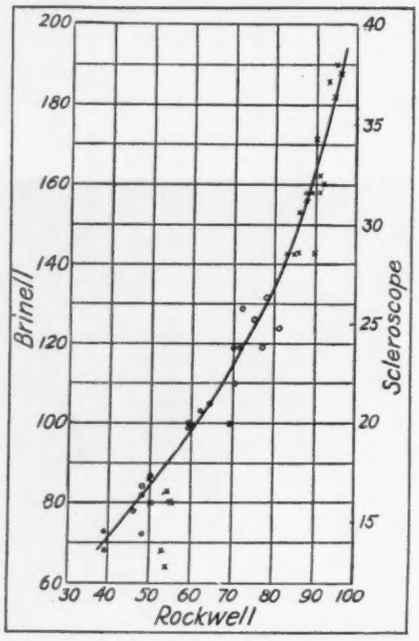


Fig. 4—Conversion curve showing the relationship between three methods for determining hardness

will apply to cold-rolled low-carbon strip steel only.

The disagreement between these results and results of other investigators is attributable to difference in materials used in the investigations. Forged or heat treated steel, or any steel which has not been cold worked, is more or less uniform to a sufficient depth to be unaffected by the method of testing. Cold rolled strip, on the other hand, has a hard case and softer core, consequently any method of testing which penetrates the case will give lower readings than a test which determines surface hardness primarily. This accounts for the fact that brinell readings given in Table III are 10 to 20 points lower than those furnished in other tables for the same Rockwell values.

Table IV

Hardness Ranges

Temper	Rockwell B	Brinell	Scleroscope
1	90 to 98	155 to 210	30 to 35
2	76 to 86	120 to 150	25 to 29
3	60 to 75	95 to 120	20 to 25
4	50 to 59	85 to 100	16 to 19
5	38 to 50	70 to 90	14 to 16

Fig. 2 is presented to indicate the approximate relationship between the various tempers used to designate the different classes of cold rolled low-carbon strip steel. Olsen ductility is plotted against gage and the chart covers all thicknesses as well as all tempers. Erichsen values can be determined by using the conversion factor of 2.68. The curves are based upon the mean percentages of reduction which generally are accepted as representative of the various tempers. Since the reduction in rolling for any one temper may vary as much as 10 per cent the curves only can serve as an indication of the average ductility of each temper and should be regarded as such. It also is impossible to control the ductility to any one point and specifications therefore should cover a sufficient latitude to allow for any commercial tolerances. The curves nevertheless, should be of assistance in determining approximate reduction.

Table IV covers the hardness of the five tempers enumerated in the first part of this report and contains the range of Rockwells, brinells, and scleroscopes for each.

Not all mills adhere rigidly to the figures given in Table IV because of diversity in designation of the tempers. In some cases the tempers will overlap because an increase in the maximum reduction for any one temper will cause some tests to fall slightly above the maximum specified. The values submitted here, however, are representative of the tempers most commonly used and should assist in the compilation of specifications.

Silico-Spiegel Deoxidizing Agent Makes Uniformly Clean Steel

A NEW alloy of silicon and manganese has been developed by the Electro Metallurgical Sales Corp., 30 East Forty-second street, New York, as a deoxidizing agent to be used in the steel bath. This alloy, known as silico-spiegel, contains from 7 to 8 per cent silicon and 25 to 30 per cent manganese. Its low melting point insures rapid deoxidation, and its composition leads to the formation of extremely large inclusions which rise rapidly, providing uniformly clean steel.

The metallurgical advantages of this material have been thoroughly studied and proved by recent work done by the United States bureau of mines. It has been found that with separate addition of spiegel and silicon pig the size of the inclusion is approximately 45 microns as a maximum. Silico-spiegel on the other hand, produces inclusions as large as 1000 microns. Since the ratio of the rate of rise of the particle to particle size increases as the particles become larger, it can be seen that the large size of the inclusions is of decided advantage in killed steel. For example, a particle of manganese silicate 50 microns in diameter will take approximately 23 minutes to rise through a 12-foot ladle of steel, while one 500 microns in diameter will require less than 15 seconds to reach the surface.

Rate of Rise Increased

When open-hearth steel is deoxidized with silicon, the average rate of rise of the particles has been found to be from 0.15 to 1.5 inches per minute. When silico-spiegel is used, the large particles have a rising velocity of 600 to 2400 inches per minute. Thus, even with a steel highly oxidized before the addition of silico-spiegel to the furnace, it was found that only a small amount of nonmetallic matter remained 3 minutes after the addition was made. This insures practically complete elimination of the products of oxidation by the time the steel is ready to teem from the ladle.

Numerous tests have indicated the proper manganese-silicon ratio to insure large inclusions varies between 2.8 and 8.7, with the best results obtained with a ratio of 4.18 for dead-killed, semikilled or rimmed steel. This condition is met in silico-spiegel, so that the formation of the largest possible particle is insured.

As was mentioned previously, the low melting point of this alloy, around 1250 degrees Cent., is an advantage in deoxidation since a slag is rapidly formed which is fusible at steel-making temperatures.

Manganese Loss Low

Since the bath is killed thoroughly by the addition of this material, the percentage of manganese lost is reduced to a minimum. It results in a saving of ferromanganese as a final addition to obtain the desired manganese content in the steel. In open-hearth heats of forging grade of steel, manganese efficiencies as high as 75 to 85 per cent frequently have been obtained. Because of its low-carbon content, silico-spiegel eliminates the necessity of excessive oreing to obtain the desired carbon content in a low-carbon steel.

Both basic open-hearth and acid open-hearth heats have been made with this alloy, and in both methods the steel consistently has been clean. More uniform results are obtained with silico-spiegel than when separate additions of spiegel and silicon pig are used for conditioning the steel bath. Thus, the use of silico-spiegel results in uniformly cleaner steels because of its low melting point and proper silicon and manganese content to insure large, rapidly rising inclusions.

Hardness and Crystal Structure of Nitrided Steels Linked

BY DR. O. E. HARDER and GEORGE B. TODD

CORRELATION of hardness and crystal structures of nitrided steels at different depths in the case suggests the desirability of developing nitrided cases consisting entirely of the alpha-iron phase. This is brought out in the accompanying article, abstracted from a paper presented at the National Western Metal Congress in San Francisco, Feb. 16-20. Dr. Harder is assistant director, Battelle Memorial institute, Columbus, O.; Mr. Todd is associated with the metallurgical division of Aluminum Research Laboratories, New Kensington, Pa.

A CONSIDERABLE amount of work has been done on the crystal structures found in nitrided steels, although a lack of complete agreement still exists. Because of the importance of the hardness of nitrided cases, hardness testing has become a well established method of examination, both in research and in production inspection. As a result, much information is available with reference to the hardnesses produced in different nitriding treatments and the depth-hardness curves for different steels and treatments.

However, little work has been published to show the correlation between hardness and crystal structure of different steels at different depths in the case, etc. This investigation had for its objective the correlation of these properties. Some consideration was also given to the microstructures.

Has Involved Study

The dissociation pressure of iron nitrides has been the subject of a number of researches. Noyes and Smith reported values 20,000 to 500,000 atmospheres. Emmet, Hendricks and Brunauer recently have determined the dissociation pressure Fe_4N at 444 degrees Cent. as 5000 atmospheres. A dissociation pressure of 50,000 atmospheres has been reported for Fe_2N. These observations are in agreement with difficulties found in trying to form nitrides from molecular nitrogen and iron. It thus seems that all the iron nitrides are metastable and should decompose, even at ordinary temperatures.

Hagg found that the nitrides richest in nitrogen began to dissociate at about 500 degrees Cent. and that at 600 degrees Cent. the pressure was greater than 200 atmospheres. Maxted, using finely divided iron which was nitrided also found the dissociation pressure at 600 degrees Cent. to be greater than 200 atmospheres.

Charpy and Bannerot found that Fe_4N was not dissociated before reaching 600 degrees Cent. Above that temperature a nitrogen pressure of 18 atmospheres reduced the rate of dissociation but did not completely prevent it.

The above data indicate that the higher the nitrogen content of the compound the greater the dissociation pressure. These relations have an important bearing on the use of nitrided products at elevated temperatures. Actual tests have shown that nitrided parts and test specimens will retain practically full hardness after heating as long as 200 hours at 450 degrees Cent. (842 degrees Fahr.), and reports are available which show only slight losses in hardness after heating as high as 650-700 degrees Cent. (1200-1300 degrees Fahr.). This probably means that the higher nitrides were not present in the case.

The present investigation had for its purpose a correlation of the crystal structures as determined by the X-ray diffraction method, the hardness as determined by the Vickers indenter, and the microstructures of the original surfaces produced on nitrided materials and of those cases at different depths from the surface.

Data Are Helpful

Naturally, the tests as outlined above throw some light on the phases present in the nitrided cases of the different kinds of steel investigated and the changes in the phases present at different depths in the case.

Materials used in the investigation included an Armco iron; a medium carbon steel; and three commercial nitriding steels, one of which was one of the early nitriding steels and the other two of later development.

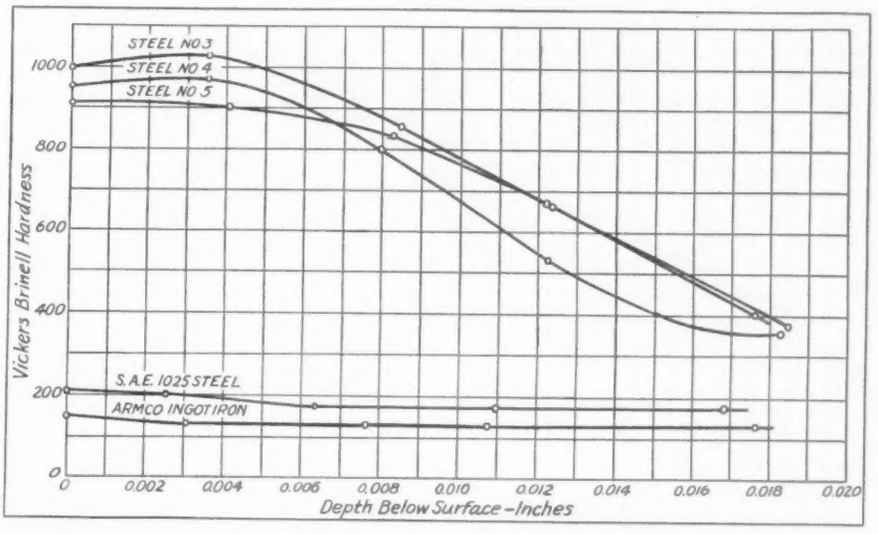
Chemical compositions, in per cent, of the specimens were as follows:

Armco ingot iron—carbon 0.013, manganese 0.017, phosphorus 0.005, sulphur 0.025.

S. A. E. 1025 steel—carbon 0.27, manganese 0.50, phosphorus 0.014, sulphur 0.038.

No. 3 steel—carbon 0.44 manganess 0.50, silicon 0.34, phosphorus 0.014, sulphur 0.020, aluminum 0.84, chromium 1.61.

No. 4 steel—carbon 0.36, manganese 0.51, silicon 0.27, phosphorus



Depth-hardness curves for five steels nitrided at 975 degrees Fahr. for 72 hours; numbers 3, 4 and 5 are commercial nitriding steels. Hardness tests were made with the Vickers indenter

0.013, sulphur 0.010, aluminum 1.23, chromium 1.49, molybdenum 0.18.

No. 5 steel—carbon 0.23, manganese 0.51, silicon 0.20, phosphorus 0.011, sulphur 0.011, aluminum 1.24, chromium 1.58, molybdenum 0.20.

The specimens all were nitrided at the same time at a temperature of 523 degrees Cent. (975 degrees Fahr.). The nitriding time was 72 hours, and the average decomposition of the ammonia was approximately 20 per cent. The specimens were cooled slowly in the furnace in a stream of ammonia to about 90 degrees Cent. They were then polished with emery and rouge, care being taken that not more than 0.0002 to 0.0003-inch was removed in polishing. They were then in turn subjected to X-ray examination, microscopic examination and finally to hardness testing average depth-hardness curves for the five samples are reproduced in an accompanying chart.

How Transition Occurs

The hexagonal close-packed lattice was found in all the samples, but it was accompanied by the face-centered cubic lattice in all of the samples, except the Armco iron. The results indicate that for the samples studied in depths below the surface that transition is from the hexagonal lattice at the surface, or the hexagonal lattice with the face-centered cubic to the face-centered cubic, and then to the face-centered cubic with the alpha lattice, and that at comparatively small depths—0.003 to 0.004-inch—the alpha lattice only is found.

The hexagonal close-packed lattice seems to be associated with the surface brittleness in nitrided cases. Cases showing the face-centered cubic and the alpha-iron lattice were not found to be brittle. Nitrided cases showing the alpha-iron lattice only have been found to possess full hardness and even show a greater hardness than the original surface. This leads to the conclusion that extreme hardness of nitrided cases can be accounted for by the presence of nitrogen in solution in the alpha-iron lattice, and that while no finely dispersed phase has been found at magnification of 1000 and no X-ray evidence of a second phase has been found, there still remains the possibility of the existence of such a phase in submicroscopic size and in such a finely dispersed condition that it will not give an X-ray diffraction pattern.

The technique worked out for the examination of nitrided cases seemed to present a more direct and satisfactory method of study than has previously been reported.

This investigation suggests the desirability of developing nitriding steels or nitriding methods which will make possible the production of nitrided cases which are free from the hexagonal lattice phase. It might be even more satisfactory to obtain a case which consists entirely of the alpha-iron phase, since this phase has been found to give the necessary hardness and appears to be free from brittleness.

Seamless Chrome-Nickel Tubes Find Many Uses

(*Concluded from Page* 33)

no contamination of the material by other metal picked up by the wheel will result.

Regarding polishing, the character of the finish of the exposed surface is the most important factor in producing resistance to stain and tarnish. The more perfect the finish, the less likelihood that the metal will discolor.

Nirosta KA2 is virtually nonmagnetic, and thus may be differentiated from ordinary steel by the use of an ordinary horseshoe magnet.

It is difficult to discuss, in a comprehensive manner, the industries wherein 18 and 8 tubing or pipe may be applied; however, a number of the principal developments may be of interest. In the refining of crude oils, the material has shown remarkable economy. Nirosta KA2 and KA2-S are being used as cracking still tubes, vapor lines, heat exchanger tubes, etc. Its greatest application, at present, has been in cracking coils where the main corrosive agent is hydrogen sulphide freed from sulphur compounds.

Long Service Indicated

Installations of Nirosta KA2 tubes in heat exchangers have shown satisfactory service, also some tubes are being used in topping stills and, while the time of installation has been too recent to give comprehensive results, long service is indicated.

The use of the material in the chemical industry has been diversified widely. From a practical standpoint, one of the most interesting properties is its resistance to nitric acid and, based on this fact, many industrial plants, either making nitric acid or handling it as a by-product, are large users of the alloy. In this type of alloy, where one of the main functions is its corrosion resistance, a majority of the installations can be considered generally as chemical and, although its applications to the purely chemical industries, as indicated by tonnage, have been wide, it is difficult to give exact information on these installations because of the fact that, while the general processes are well known, the improvements in apparatus are more or less the individual company's trade secrets.

The milk industry has found that Nirosta KA2 is completely immune to attack from lactic acid as present in either sweet or sour milk and, in addition to this, experience has shown that Nirosta KA2 is equally immune to abrasive and the corrosive actions of the cleansers used.

The use of this material in the food industry presents a slightly different corrosion problem than the generally accepted one, inasmuch as there must be no contamination of the food, or any objection on the part of the health authorities. Nirosta KA2 is being used for evaporator tubes in the citrus industry where the citric acid present in lemons, pineapples and oranges is the corrosive agent. Vinegar plants are using the metal in pipe lines to resist the acetic acid present in vinegar.

Used in Paper Mills

The paper industry, particularly those mills employing the sulphite process, is using Nirosta KA2 for relief lines, digester piping, etc. The use of this alloy is particularly in evidence in the digester circulation systems which are now being developed. It is of interest in connection with circulation systems that the corrosion-resisting alloy is of about the same weight as steel and lighter than lead, nickel or copper.

Further successful applications have been to withstand the alum in water treatment plants, resisting the "hypo" solution used in photography and handling the mixed acids used in the manufacture of gun cotton.

A partial list of potential and actual applications for the use of Nirosta KA2 tubing is as follows:

Aeroplane Industry: Exhaust tubing.

Bleacheries and Dye Plants: Pipe lines; condensers; and heating coils.

Rayon Industry: Brine cooling systems; feed lines to spinnerets; and drying rolls.

Steam Generation: Superheaters; flue gas sampling tubes; flowmeter piping; high-temperature piping; water treatment plants; domestic heating plants; and automotive boilers for buses and steam cars.

Automotive Industry: Tubing in connection with automobile trim.

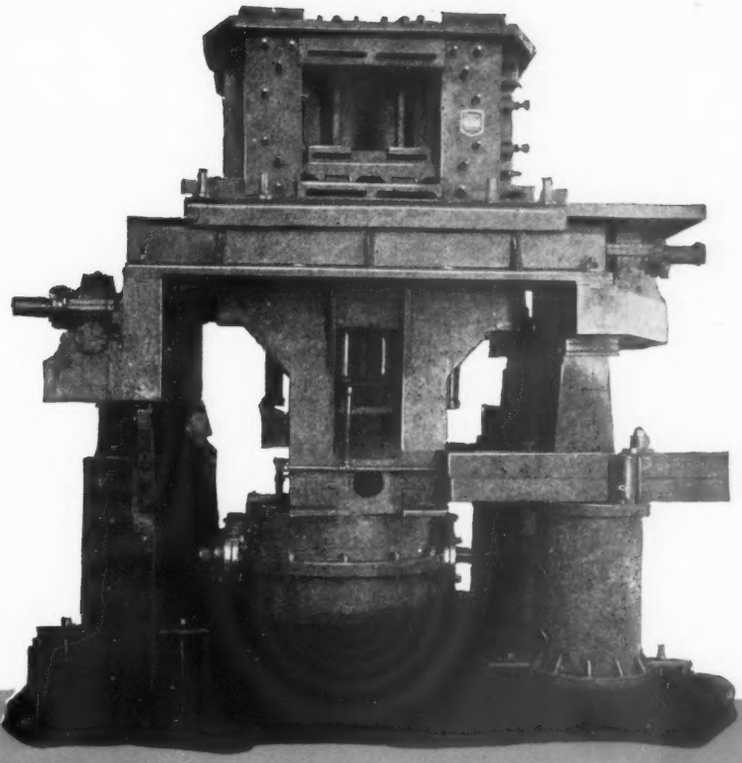
Food Industry: Milk machinery; fruit juice evaporators and pipe lines; soft drink machinery; bottling machinery; vinegar plants; and general canning machinery.

Nitric Acid Industry: Plants for fixation of nitrogen; manufacture of ammonia; manufacture of nitric acid by oxidation of ammonia; and manufacture of gun cotton.

Chemical Plants: Diversified uses, such as in nitric acid industry; photo developing equipment; drugs and light chemicals; insecticides and fertilizers; and general plant piping.

Laundry Machinery.

Heating Element Coverings: Protection tubes for pyrometers; barber-shop sterilizers; etc.



Treadwell Mill with Vertical and Horizontal adjustment. Gears with cut teeth enclosed. Force feed lubrication to all bearings.

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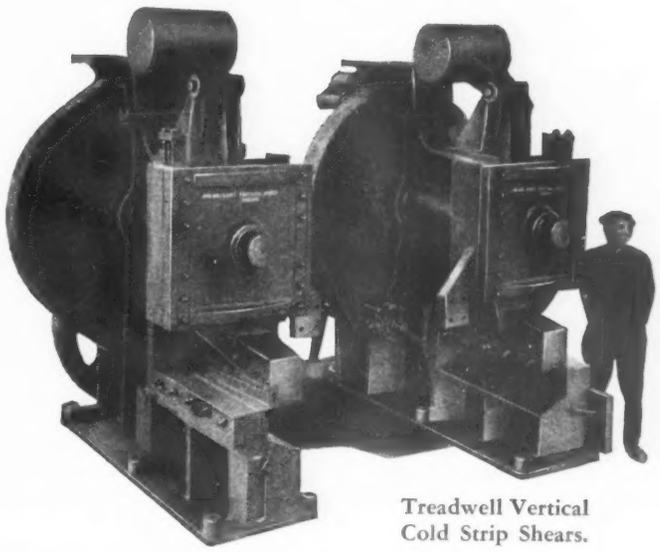
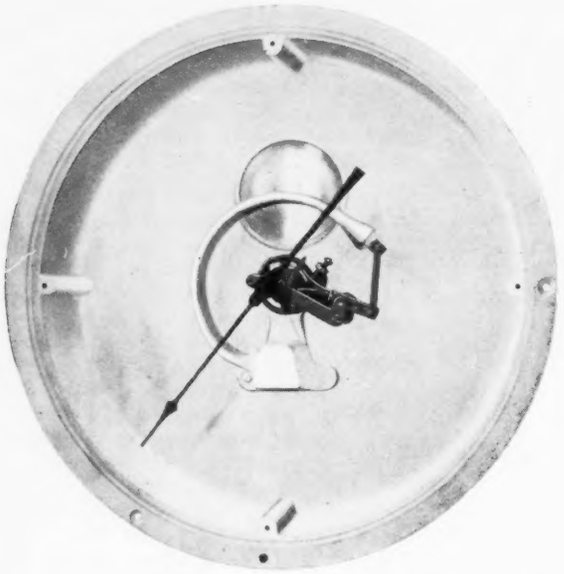


Treadwell Vertical Cold Strip Shears.

BETTER GRADE MACHINERY

Treadwell Engineering Company

Easton, Pa.



Pressure Gages

◆

187th Article

Large Uses of Steel in Small Ways

AS THE public becomes more mechanically minded, more pressure gages are needed to keep it informed about mechanical matters with which it was little concerned a few years ago. Oil burners, pumps, ventilating systems, steam cooking kettles and dozens of other mechanical units require pressure gages for proper operation or control.

The most common use for a pressure gage is in the oiling system of an automobile. Small pressure gages now are standard equipment on nearly all automobiles and trucks and about 4,000,000 of such gages, are produced in this country each year. These gages are made almost entirely of steel. The case is a sheet steel stamping, the spring which operates the pointer is usually made of a seamless steel tube, the movement which connects the spring with the pointer is made of strip steel, and the socket which connects the spring with the pressure line is sometimes a steel forging, although more frequently in the lower price gages it is a casting.

Using Alloy Steels

In industry the trend toward higher pressures and greater accuracy of control has brought about an increased demand for high-grade pressure gages and the problem of manufacturing them is being solved by the use of alloy steel. One type of gage has a spring made of chrome-molybdenum steel, its movement made of nitralloy steel, and the dial and some other parts of Nirosta steel. To obtain greater accuracy the springs for these gages usually are made from solid bar stock which is bored to form a tube, threaded at both ends for capping and attaching to the supply line, and then bent into the semicircular form of the dial gage spring or Bourdon tube.

It is difficult to estimate the amount of steel used in manufacturing gages because of the great variety in style, size and type. After weighing and examining several types of automobile dashboard gages a manufacturer estimates that the amount of steel used in one automobile pressure gage would average ¾-pound. Thus, for 4,000,000 of this particular type of gage manufactured each year 1600 tons of steel would be required.

5,000,000 Gages a Year

The number of gages manufactured for purposes other than automobiles is estimated at 1,000,000 a year. One of the largest manufacturers produces in normal times 40,000 pressure gages a month. Of the 1,000,000 gages used outside the automotive industry 20 per cent or 200,000 gages are estimated to be in the high-grade, high-pressure class, requiring alloy steel. The amount of alloy steel used in the average size of such a type of gage is about 3 pounds which for 200,000 gages is equivalent to 300 tons.

The weight of steel in the remaining number of gages, estimated at 800,000 averages about 2 pounds per gage, or a total of 800 tons. These items added to the estimate for automobile gages gives a total of 2500 tons of steel used each year in the production of pressure gages.

Reinforcing Steel Tonnage Drops 5 Per Cent in 1930

From the extreme of the greatest construction volume ever known in 1928 and 1929 to the most serious business depression in the history of the industry in 1930, the decline in reinforcing steel tonnage was only 5 per cent. This situation was emphasized by C. Louis Meyer, president, Concrete Reinforcing Steel institute, in addressing the institute's seventh annual meeting in Biloxi, Miss., March 16. Mr. Meyer stated that this splendid showing was undoubtedly due to the fact that reinforcing steel is used in so many diversified fields.

This material is used in buildings of every description and type; in roads, pavements and bridges; in engineering work of all kinds, including dams, sea walls, sewers, reservoirs, etc. The industry is particularly fortunate, he observed, in having such a widely diversified use of reinforcing steel; for those construction products which are used only in buildings have suffered a far more drastic decline in volume.

Reviews Year's Work

Reviewing activities of the past year, Mr. Meyer said:

"One of the outstanding economies to the industry accomplished by this institute has been developed through its program of standardization. During this year the standard 11 sizes of bars will practically be in universal use throughout the entire United States. The adoption of intermediate grade as a single standard grade for reinforcing bars has resulted in shipments of about 87 per cent of the billet steel tonnage as reported by the members to the institute during the past two years. This percentage will be substantially increased during the present year, for the Pacific Coast is now in a state of transformation from structural to intermediate grade."

A committee of the institute shortly will offer a complete report on the subject of a quality mark for reinforcing bars. Definite progress has been made in this direction, and according to Mr. Meyer, a quality mark applied to reinforcing bars of new billet grade with the support of the steel mills and with an ample promotional and advertising campaign carried on by the institute will accomplish much in the elimination of inferior grades of bars. Real promotional effort on the part of members of the industry and an ample advertising campaign by the institute is absolutely essential if the quality mark idea is to be carried through to a successful conclusion.

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

USES:

Cemented Tungsten Carbide

Summary of the development of cemented tungsten carbide and its application to cutting tools, by L. J. St. Clair, a paper presented at the annual meeting of the American Society of Mechanical Engineers in New York, Dec. 1-5, 5 pp., no illusts.

Knowledge of tungsten carbide can be traced back 40 years or more; however, due to certain inherent physical weaknesses little general interest in the material developed until comparatively few years ago. Messrs. Baumhauer and Schroter of the Osram Lamp Works, Berlin, first applied this material to wire-drawing dies as a substitute for diamonds.

Granted that the physical properties of cemented tungsten carbide are known and that the economic value of the material is appreciated, four factors must be assimilated further to lead to the successful application of the cutting material. They are: Design of a cemented tungsten carbide tool; the machine tool; care of the tool in operation; and grinding of the tools. The author examines each of these four factors and points out details which must be observed if best results are to be obtained from the use of the carbide tools.

STEEL, 3-19-31

FABRICATION:

Vitreous Enameling

Development of the industry and types of furnaces discussed by Fred McC. Burt, in Industrial Gas, March 1931, p. 24, 2½ pp., 6 illusts.

The white scum on enameled ware is due to the presence of sulphur in the burning atmosphere. It can be washed off but usually reappears. As low as 0.0025 per cent sulphur dioxide in the combustion atmosphere may cause this appearance. Blisters caused by gassing arise from the presence of reducing gases in the burning atmosphere. As low as 0.6 per cent carbon monoxide has caused blistering. With no free oxygen in the combustion chamber there is likely to be a ruffled surface in the ground coat. At least 10 per cent excess oxygen should be available when treating sheet steel ware with sulphur-free gas. A general arrangement and cross section of a stationary, gas-fired frit smelter accompanies the text.

STEEL, 3-19-31

Cutting Tools

Physical properties of stellite and details of several machining operations on which it is being used successfully, by W. A. Becker, E. E. Gordon, and W. A. Wissler, a paper presented at the annual meeting of the American Society of Mechanical Engineers in New York, Dec. 1-5, 6 pp., 6 illusts., 15 tables.

The most important property of this cobalt-chromium-tungsten alloy is its red hardness. Investigations of this hardness were made up to 1100 degrees Cent., indicating that the material is harder than high-speed steel at temperatures above 500 degrees Cent., a feature which is thought to account for superior cutting ability.

When used for milling, three typical jobs on cast iron showed 87, 100 and 27 per cent increased production, respectively, over high-speed steel. On boring cylinder blocks the increase was 64 per cent. Turning operations in cast iron show 33, 35 and 60 per cent increases in production, and on steel, 123 and 93 per cent.

STEEL, 3-19 31

PRODUCTION:

Chromium in Cast Iron

Effect of chromium in cast-iron mixtures, discussed by T. F. Jennings, Transactions & Bulletin, American Foundrymen's association, February 1931, p. 801, 7 pp., 4 tables.

The use of chromium in cast-iron mixtures as practiced in the past is described, and effects produced by varying combinations are discussed. Chromium, when added to molten iron, is said to combine chemically with the carbon and iron, reducing the amount of graphitic carbon and closing the grain of the metal. Chromium for general purposes is said to be most effective when under 1 per cent of the mixture. Transverse strength and deflection usually are increased by additions of chromium up to 0.50 per cent. Results of various tests performed by the author are included.

STEEL, 3-19-31

Stainless Steels

Origin of stainless steels and alloys, discussed by J. Ferdinand Kayser, in Metallurgia, February 1931, p. 135, 1½ pp.

Corrosion-resisting properties of iron-chromium alloys have been recognized for more than 120 years. Between 1795 and 1815, Vauquelin who discovered chromium, experimented with the element and came to the conclusion that it, along with phosphorus and manganese, was the cause of hot and cold shortness in wrought iron. In 1872 the first provisional patent application was made for a corrosion-resisting steel containing chromium, but no final patent was applied for. The first significant references to corrosion resistance appeared in 1903 when a British patent was granted to a French firm.

STEEL, 3-19-31

MISCELLANEOUS:

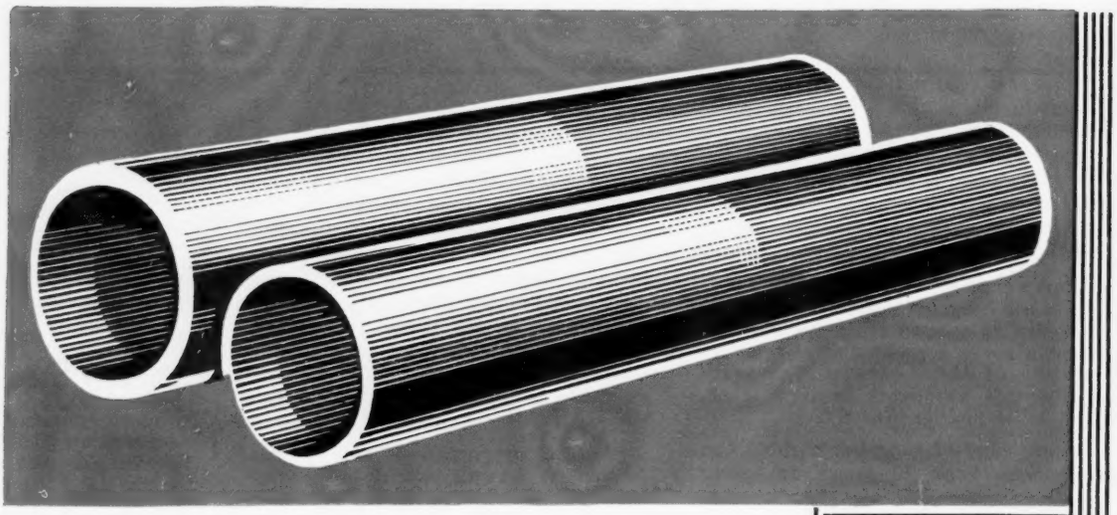
V-Belts

The V-belt for power transmission and its application to mechanical handling equipment, from the December, 1930, Materials Handling News, published by Dodge Mfg. Co., Ltd., Toronto, Ont., 2 1/3 pp., 7 illusts.

A number of advantages are claimed for the V-belt drive, including minimum space required, positive speed, rugged composition, smooth starting and running, elimination of vibration, less maintenance, less adjustment, quietness, cleanliness, and easiness on bearings. Fundamental data on V-belt design are presented and five prerequisites of a successful V-belt are set forth to be: Flexibility; crosswise rigidity; prestretched construction; nonglazing contact surface; and minimum heat generation.

STEEL, 3-19-31

ANNOUNCING ~
2 *New Developments*



IN ELECTRIC WELDING . . .

1 After years of research and experiment, STEEL & TUBES INC., announce the development of a new Electric Welding unit which welds steel tubing up to ¼-inch gauge. Manufacturing economies thereby effected are passed on to you as a user, and, in addition, a better heavy wall tubing is made possible by this process.

You can absolutely depend on the uniformity of the wall thickness in heavier gauges as manufactured by Steel & Tubes Inc., from 0.004 to 0.008 plus or minus according to diameter and thickness. And remember, this uniform wall thickness means uniform strength.

List of sizes shown opposite. Send us your problems.

2 High carbon structural steel tubing—made from rail carbon stock—is now being successfully electrically welded for the first time.

This new development results in a better product at no increase in cost. STEELTUBES high carbon structural steel tubing possesses great strength, toughness and rigidity and is recommended wherever these qualities are primary requirements. It is available in rounds, squares and rectangulars, can be hot galvanized very successfully, and makes a better finish than ordinary pipe.

May we have an opportunity to show you how we can help improve your product by the use of this material?

HEAVY WALL SIZES

2½" O.D.
4 to 18 gauge

2¾" O.D.
4 to 18 gauge

3" O.D.
3 to 19 gauge

3¼" O.D.
3 to 18 gauge

3½" O.D.
3 to 16 gauge

3¾" O.D.
3 to 16 gauge

4" O.D.
3 to 16 gauge

STEEL AND TUBES, INCORPORATED
World's Largest Producer of Electrically Welded Tubing
CLEVELAND, » » » « « « OHIO

A UNIT OF REPUBLIC STEEL CORPORATION

Steeltubes

Write for a copy of Booklet B-9.

Machine Tools and Plant Equipment

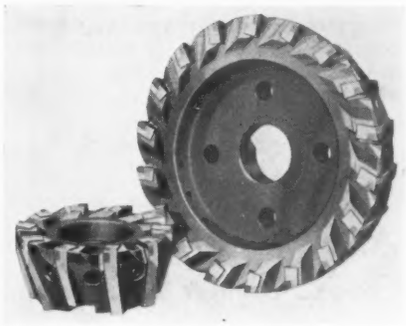
«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Inserted Tooth Mills Have Tungsten Carbide Blades

Kearney & Trecker Corp., Milwaukee, has put on the market a new line of inserted blade face milling cutters which are designed especially to utilize cemented tungsten carbide blades. As is indicated in the accompanying illustration, each blade is given solid contact along its entire back face, a feature which is essential to successful application of cemented tungsten carbide.

The blades are set practically flush with the face of the cutter body, chip clearance being attained by slotting the body. The bodies are heavy steel forgings which are heat treated, hardened and finished by grinding. Blades have tapered faces and are held in position by wedges having corresponding taper. The wedges are locked by hardened screws. End slippage of blades is prevented by hardened steel pins set into the cutter body and fitting into slots machined across the blades. One pin is used to each blade, adjustment by increments of 1/16 inch being possible by having five holes in each body slot and four slots across each blade.

These cutters can be furnished in diameters ranging from 5 to 14 inches, right or left hand, with blades for medium, semiroughing or finishing cuts.



Face milling cutters are designed for tungsten carbide blades

◆

Motors Are Synchronized by Simple System

General Electric Co., Schenectady, N. Y., has developed a new system whereby exact agreement in operating speeds of two or more non-synchronous electric motors can be maintained.

Special small generators are mechanically connected to the shafts of the motors to be held in exact speed relation, and under normal conditions these small generators are in synchronism. A differential motor has its stator connected to one generator and its rotor to another and while the generators are in synchronism this motor has no tendency to rotate. Any deviation in speed between the generators, however, causes the differential motor to rotate forward or reverse, depending upon which generator is ahead. The resulting motor speed is equal to the difference between generator speeds.

This differential motor is geared to a cam which actuates a carbon pile resistor which is connected in the field circuit of one of the synchronized motors. Resistance of the carbon pile varies with the pressure, thus changing the motor speed to reestablish a balanced condition. Under this system a single manual control governs two direct current motors. Adjustments in speed of one drive motor immediately are reflected by exactly proportioned changes in the associated motor, as in the case of motors driving feeding and processing units of a machine. Simple gearing to drive one generator can be used to maintain predetermined proportioned speed relations between several mechanisms driven by synchronous motors of widely divergent speeds.

◆

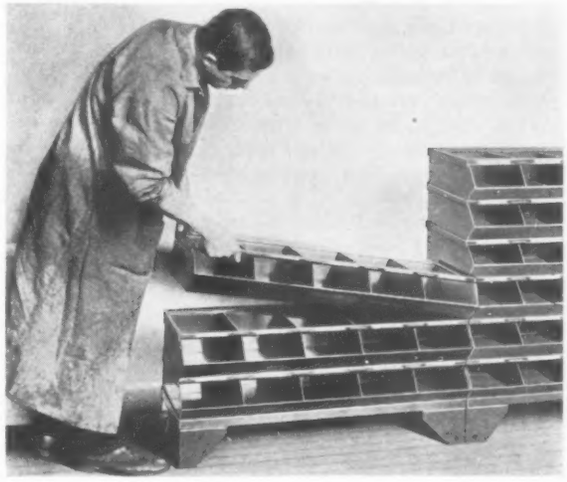
Bin Sections Assemble Like Sectional Bookcases

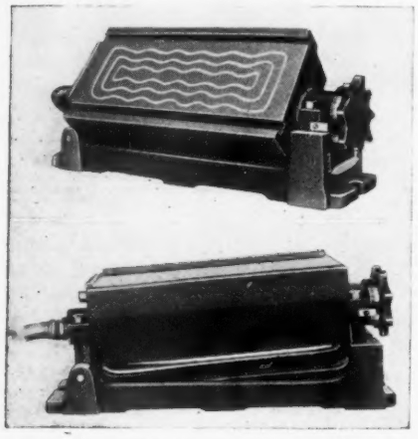
Simplex Tool Co., Woonsocket, R. I., has developed new bin section units for use in stockrooms of industrial plants. As shown in the accompanying illustration, several units can be built up, one on top of the other after the manner of a sectional bookcase. Each section nests deeply into the other, being of sufficient width and depth so that several nested together make a substantial assembly. As the units are not bolted together they may be rearranged easily at any time. The manufacturer points out that their portability makes these bin sections ideal for temporary stockrooms on construction jobs.

The base shown in the illustration is a separate unit from the bin sections. A top of similar character also can be furnished to serve as a counter, or as a shelf when large and small sections are assembled together. In the latter case larger sections are used up to counter height, and smaller sections from that point up.

These bin sections are made in four standard sizes, all of which fit into each other. The dimensions are

Standardized bin sections of rugged sheet steel construction readily assemble into convenient units to meet conditions in various kinds of industrial stock rooms





Angular work is ground readily on this adjustable magnetic chuck

37 x 12 x 4 inches; 37 x 15 x 5¼ inches, 37 x 18¼ x 6½ inches, and 37 x 20 x 9½ inches, respectively. Special sizes are furnished on special order.

◆

Resilient Drafting Board Eliminates Inking

W. H. Long Co., 420 North Clark street, Chicago, announces a unique type of drawing board top which eliminates the necessity of inking mechanical drawings for ordinary shop use. This drawing board top is composed of composition material which has a permanently white and smooth surface at the same time tough, resilient, stainproof, scratchproof and easily and safely washable with soap and water.

Method of Drawing

Ordinary drawing paper is attached directly to this surface and a 3-H or harder pencil is used. All lines are drawn with a double stroke and with a slight pressure on the pencil. The pressure of the first stroke ridges the paper and the back stroke fills the resulting "valley" evenly with lead. The result is a solid, opaque, even-edged line which enables blueprints, van dykes, etc., to be made with clearness equal to that resulting from inked lines. Changes can be made in any line by the usual erasing process, the "valleys" which remain leaving no trace on the reproduction. Because of the resiliency of the board, indentations in its surface made by the pressure of the drafting tools disappear immediately. On account of hard leads being used, marks of which lie in the "valleys" in the paper, lines do not smudge when worked over. Hence drawings made on this type of board, even after long filing, yield prints equal in clearness to those from new ones.

The material is furnished in sheets ⅛-inch thick and of any required size, top edges being slightly rounded. These sheets can be glued or otherwise fastened to old boards and their life under ordinary use is estimated at eight to ten years. This material has been given hard use for more than two years in two large drafting organizations and it is claimed that a direct saving of 35 per cent has resulted, in addition to attaining quicker output of drawings with minimum working space and personnel.

◆

Adjustable Magnetic Chuck Gives Angular Settings

J. & H. Electric Co., Providence, R. I., has developed a combination swivel and taper magnetic chuck for general use in tool rooms where considerable grinding of bevels, tapers, etc. is carried on. This chuck, which is available in 5 x 13 and in 7 x 16-inch sizes, is shown in two positions in the accompanying illustration.

The construction is light but rugged, and all adjustments are easily and quickly made. Essential parts are a base, cradle and trunnioned magnetic chuck. The base clamps to the machine and carries the cradle (pivoted at one end), elevating screws, indicator plates and pointers for taper grinding. The cradle has as integral parts, capped bearings for the chuck trunnions.

For grinding bevels the cradle is locked in zero position and chuck is swiveled to the desired angle, as indicated by a ring with 2-degree graduations; the maximum bevel being 45 degrees from horizontal in either direction. For grinding tapers the chuck is locked in zero position and the cradle raised, by means of elevating screws, until indicator registers the desired taper. This indicator is graduated in steps to ⅛ inch per foot to a maximum taper of 1 inch per foot.

◆

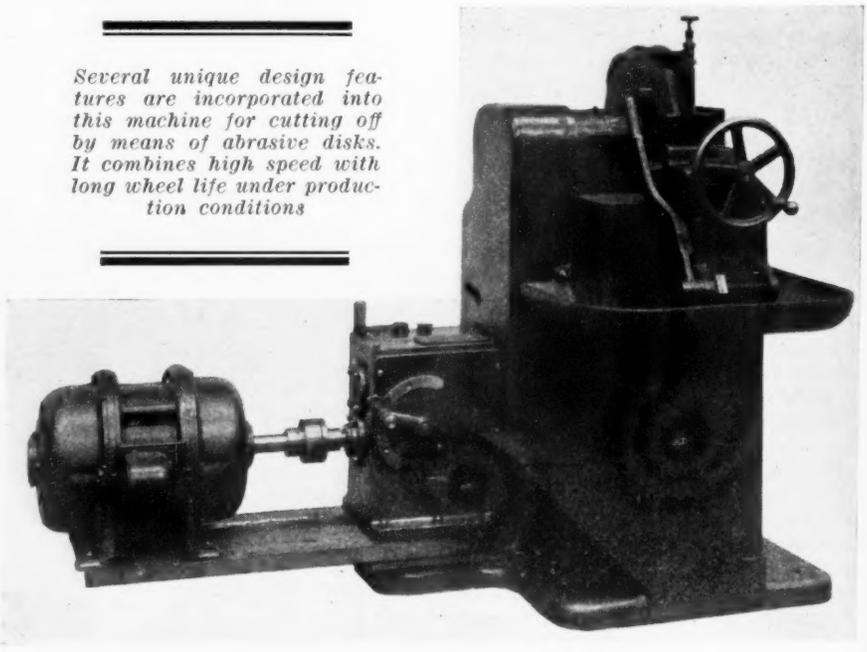
Abrasive Cut-off Machine Does Fast Work

Cochrane-Bly Co., Rochester, N. Y., has developed an abrasive cut-off machine for which is claimed improved efficiency along the lines of wheel life and cutting speed. The machine, together with its motor drive unit, appears in the accompanying illustration.

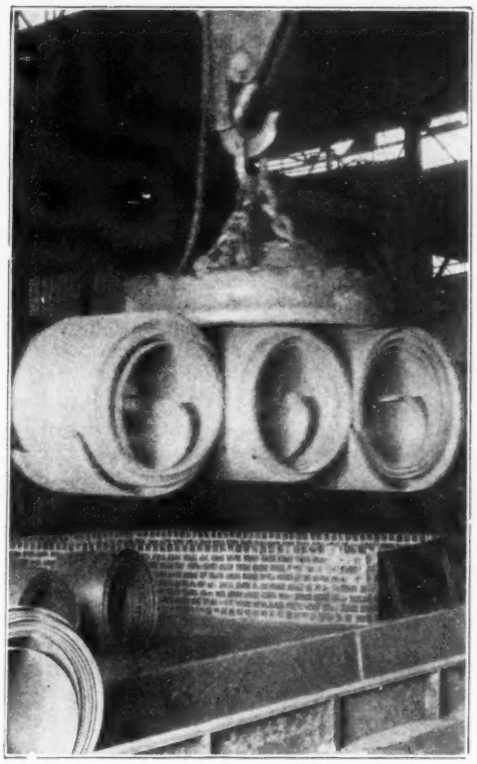
This production cutting off machine has a hardened and ground spindle mounted in dust-proof roller bearings, an a heavy carriage mounted on ball bearing ways giving free and easy movement of the carriage, which is moved to the work by means of a lever giving a ratio of about three to one. The carriage is extended at the front underneath the knee, and fully covers the ball bearing ways protecting them from grit which may result from the grinding.

The machine is driven through a 4-speed gear box having hardened nickle steel gears running in oil, and shafts mounted in roller bearings. This gear box provides four speeds

Several unique design features are incorporated into this machine for cutting off by means of abrasive disks. It combines high speed with long wheel life under production conditions



Standard round Ohio Lifting Magnets are quite efficient for handling finished stock (hot or cold) as well as scrap or pig, if it must be moved in large quantities, with almost unlimited life and very low upkeep cost because they are designed for the roughest work. The new annular rings on bottom plate prevent wear to point of danger.



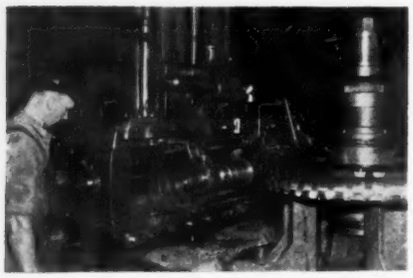
55" Ohio Round Magnet handling heavy rolls of strip steel

OHIO reliable MAGNETS

WHAT IS YOUR PROBLEM?

The Ohio Electric Mfg. Co.

5906 Maurice Avenue
Cleveland, Ohio



This machine makes effective application of an unusual hobbing system

varying from 2400 to 3600 revolutions per minute spindle speeds which gives peripheral speed to the 16-inch abrasive wheel of 10,000 to 15,000 feet per minute. The machine can be speeded so that the speed changes compensate to a degree for the wear in the wheel diameter, thus maintaining approximately uniform peripheral speed as the wheel wears down through the abrasive action between wheel and work.

The machine is driven from the speed box to spindle by multiple V-belts, having an idler pulley to compensate for variation in centers of pulleys due to carriage movement, and to maintain a uniform belt tension. The machine is designed for either wet or dry cutting, and is provided with a pump which delivers a stream of coolant or lubricant to the wheel. The manufacturer has demonstrated that the wear of the wheel when cutting wet is just half the wear when cutting dry for a given number of cuts at the same rate. 1 7/16-inch round cold rolled bar it is stated has been cut on this machine in 2½ seconds, and 1-inch rounds or squares in about 1 second. The machine is equipped with a hand operated vise with powerful grip.

◆

Gear Hobber Operates on Tangential System

George Scherr Co., 142 Liberty street, New York, is marketing a new type of gear hobbing machine featuring tangential feed. The accompanying illustration shows the main working portion of this machine in operation cutting a worm wheel of large diameter.

With this machine worm wheels may be cut by two different methods, either by feeding the hob radially into the gear blank until the correct depth has been reached, or by employing a cross feed, in which case a short hob, preferably a tapered one, is fed axially past the work. The advantage of this last mentioned method is that whenever small lots of gears are required it is unnecessary to purchase expensive special hobs, as a simple single-tooth fly cutter will produce perfectly satisfactory results.

The tangential method of cutting worm gears is particularly desirable in the case of small diameter worms with multiple threads and large helix angles, the use of which is steadily on the increase. In the case of worm gears having a helix angle about 8 degrees, this method avoids destruction of tooth flanks and consequent insufficient bearing contact resulting in quick wearing of the drive. Under this method, the exact distance at which worm and wheel are to operate is set on the machine by means of scale and dial graduated to 0.001 inch. At the start, the hob or fly cutter is at one side of the worm wheel blank, and while hob and gear perform a combined rotary motion, the hob or fly cutter is fed into the blank in the direction of its axis. This axial feed toward the wheel necessitates that, in addition to this motion, a secondary motion be imparted to the blank. This is obtained through a differential change gear mechanism which connects the index gears with the feed.

Calculations Avoided

Being entirely independent, the index change gear, the feed gears and differential gears require no difficult or tedious calculations in connection with setup. Feed is obtained by a quick change gear box on the side of the machine and by means of three lever positions and two pick-off gears, 24 different feed changes ranging from 0.006 to 0.327 inches can instantly be obtained. Index change gears which determine the number of teeth to be cut, are located at the rear of the machine and are selected from blueprint tables furnished with the machine.

The machine has a maximum diameter capacity on spur, worm, and spiral gears of 90½ inches, with faces up to 23½ inches. Its pitch capacity is 2¾ circular pitch. Hobs up to 13¾ inches can be used and minimum and maximum center distances are 3⅛ and 50 inches respectively. Main drive is by a 15 horsepower motor, with a separate 5 horsepower motor to give rapid adjustment to upright cutter head and tangential feed slide, and a 1/3 horsepower motor to drive the automatic lubricating system. Net weight of the machine is about 31,000 pounds.

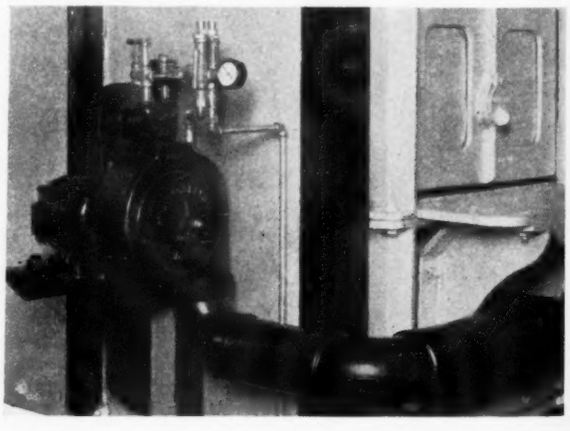
◆

Automatic Oil Burner Is Designed as a Unit

Ryan, Scully & Co., 3711 Wissahickon avenue, Philadelphia, has introduced a new type of automatic low-pressure industrial oil burner, all elements of which are combined into one compact unit. The accompanying illustration shows the unit as it appears installed on the small type of industrial furnace for which it primarily is designed.

The blower, contained in the main housing of the unit, is connected directly to the motor shaft, upon which shaft also is located a V-belt pulley from which the pump is driven. The pump is located on top of the blower housing. A large capacity strainer is placed at the inlet of the oil suction line, and an additional strainer is installed at the atomizer head. Being of the fully enclosed type, the motor is impervious to dirt, corrosive atmosphere, etc. To insure thorough mixing, an air spiral is located directly back of the atomizing head. This causes the air stream to cut into the atomized oil spray in such a manner as to deliver air to all parts of the atomized oil, thereby insuring immediate ignition and complete combustion.

When functioning of either hand or automatic control makes burner ignition necessary, the pump being in con-



Low pressure oil burner for small industrial furnaces is built as a compact unit having full automatic control assuring safety in operation

stant prime, immediately begins to draw oil through the strainer and to pass it to the regulating valve. In the meantime the air blast has started. A relief and pressure regulating valve, is preset to give correct pressure for complete atomization, and before any oil can pass into the atomizing line, its pressure is correct. At that time, the dual valve opens and the oil goes to the atomizing head, in which it is ignited immediately. Uniform pressure is maintained at all times, any balance of unused oil being bypassed and returned to the tank. The atomizing head is cleaned through a service door which gives ready access to the interior of the unit. This burner will handle any of the light oils down to what is commonly known as grade No. 3 fuel oil.

When gas ignition is used, standard equipment includes a pilot burner with hand valve, and in case of electric ignition, transformer and complete electrode assembly. At an additional cost, an automatically controlled air intake valve can be furnished to eliminate possibility of air induction when the burner is not in operation.

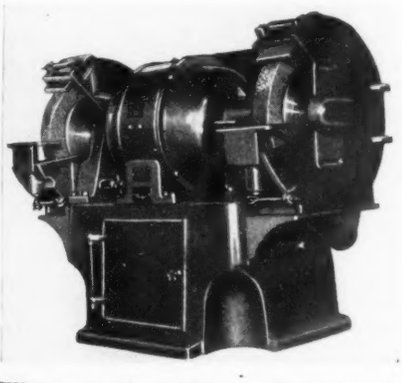
◆

Speed of Stand Grinder Is Controlled Automatically

Black & Decker Mfg. Co., Towson, Md., has introduced a new 24-inch stand grinder with an automatic speed control to maintain 6000 or 9000 surface feet per minute. By maintaining correct cutting speed the life of the grinding wheel is lengthened and metal is removed quicker with less effort on the part of the operator, on account of the high cutting efficiency.

This speed is controlled and maintained by means of a rheostat link connected to the guard. As the guard is moved forward to follow up the wheel wear, the speed of the motor is automatically advanced without additional adjustments of any kind.

The tool rest and automatic spark lip are mounted on the guard so that it is necessary for the operator to adjust the tool rest as the wheel wears. In doing so, speed of the wheel is increased by correct degrees. The grinder is equipped with an extra heavy duty motor designed to give uninterrupted service under the severe conditions imposed by a machine of this kind.



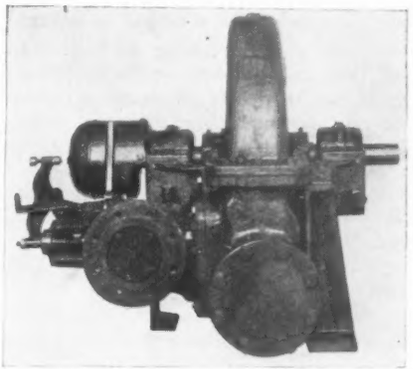
Wheel speed suited to diameter is given by automatic regulator

◆

Small Turbine Is Designed To Drive Fans and Pumps

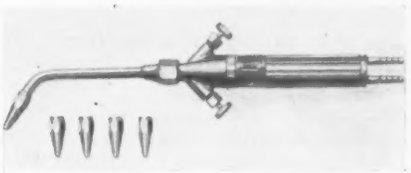
General Electric Co., Schenectady, N. Y., announces an addition to its line of small, mechanical drive steam turbines. This turbine, shown in the accompanying illustration, is recommended by the maker for driving fans, pumps and similar industrial machinery for which direct drive by a compact steam motor is desirable.

By limiting the range of conditions under which this turbine is expected to operate, it has been possible to decrease its length and width, making it unusually compact as well as cutting down the weight. Support is at the center line which allows expansion without affecting shaft alignment. This feature is an important factor in eliminating vibration in a high speed machine of this character.



Single stage turbine is compact and light in weight

The machine is single stage only and designed for operation at steam pressures up to 250 pounds and at speeds ranging from 1200 to 4000 revolutions per minute. It has capacity up to 250 horsepower and is equipped with speed regulating and emergency governors. Pipe connections are made to the lower half of the case to facilitate opening for inspection and to facilitate occasional repairs.



Exacting welding of thin sections is purpose of this blowpipe

Medium-Pressure Blowpipe Welds Sheet Metal

Linde Air Products Co., 205 East Forty-second street, New York, has added to its line an improved blowpipe designed for use on sheet metal. This equipment, shown in an accompanying illustration, is recommended for airplane fuselage welding, as well as for various other kinds of light work.

In general design and appearance it is similar to various other blowpipes manufactured by this company, the main difference being that it operates on the medium-pressure principle. The gases mix immediately in front of the handle, oxygen and acetylene valves being located so as to be readily adjustable with the thumb and forefinger of the hand holding the blowpipe. The blowpipe is 10-½ inches long, weighs 10 ounces and is well balanced. Six different sizes of tips are available, five tips being supplied as standard equipment.

The complete welding outfit with which this blowpipe is supplied includes, in addition to the blowpipe and tips, an oxygen regulator, an acetylene regulator, two 25-foot lengths of 3/16-inch hose, 1 pair of fiber spectacles, 4 hose clamps, and an instruction book.

◆

Electric Metal Heater Is of One-Electrode Type

American Car & Foundry Co., 30 Church street, New York, has put on the market a one-electrode type of metal heater which allows a clear view of the work during the heating process.

This device will concentrate the heating effect at a given spot on bars from ⅜ to 2 inches in diameter—the length of the heated portion being selective up to about 8 inches. The work rests on the lower electrode and is gripped by overhanging jaws of a parallel electrode.. Heating effect is concentrated between the contact points of the jaws. On ordinary work the electrical consumption varies from 18 to 20 kilowatt hours per 100 pounds of metal heated.

Mirrors of Motordom

(*Concluded from Page* 25)

About a year ago, Chevrolet considered bringing back its production of bumpers to Detroit, but business conditions were unfavorable.

The spring plant today has heat-treating equipment and other production facilities common to the manufacture of both springs and bumpers and as the new bumper plant will be built adjacent, a duplication of activity will be abolished.

◆

"Combination steel" is the name given to the new experiments with veneering carbon slabs with 18-8 chrome-nickel steel, mention of which was made briefly and preliminarily in these columns recently.

The idea for coating the carbon billet is said to have originated in Germany about a year ago and was brought to this country by Lockheed, of aviation fame, with the idea of selling the production rights to American steel mills for a rumored $250,000 flat purchase sum. Several alloy mills are experimenting with this innovation at present. Budd Wheel in Detroit is working on some experimental work with it.

However, one of the obstacles to be overcome lies in fabrication of the slab into, say, bumper stock. The rough edges cannot be smoothed over, once cut, and the veneer plainly shows, according to one authority.

Low-Price Alloy Seen

A leading steel producer is confidentially reported to be placing on the market within the next few months a steel that will solve the bumper problem by being a solid material with all the qualities of corrosion-resistant steel, but as cheap as carbon steel.

Some time ago corrosion-resistant veneered auto valves were made, but it was found that the cost of their production was as great as solid corrosion-resistant steel valves, instead of those with a carbon core.

Buick is considering going to a new innovation in metal stamping for its radiator shell.

Shells are stamped by an ingenious method on which patent is held by the City Auto Stamping Co., Toledo, O. The thin strip for the shell is marked out, several at a time, to a sheet, then cut out. These strips resemble a band with ends tapering at an approximate 120 degree angle. Ends are jointed together temporarily and then put on the die and press.

The shell is made by stamping from the inside out, instead of the usual fabricating process from the outside in. The economy lies in an approximate 20 per cent saving in metal and uncounted saving in time and labor as the stamped shell, with an outside-in stamping operation, has a smooth-finished outside surface and is ready to go straight to the chromium platers.

No polishing, grinding, nor abrasive work is necessary and all the unslightly seams, "wrinkles" and scoring the die often produces are on the inside of the shell where smooth finish is not a requisite.

A flash weld is employed to join the small bottom sector to the top piece, otherwise the part would be one-piece.

Oakland-Pontiac and Plymouth are using this type shell on their new models, and the Toledo company is working this week on 1000 shells for the new DeVaux, made at Grand Rapids. Buick is being induced to take the labor and material saving stamping method on for its coming 1932 model.

Schedules Are Expanding

Production schedules have in many instances shown betterment.

In the class next to Ford and Chevrolet, of those makers assembling an approximate 10,000 cars this month, are found Hudson-Essex Oakland-Pontiac, Willys-Overland and Buick.

The Hudson plant works intermittently, but averages three days a week and makes about 1500 cars of both Hudson and Essex lines. The company plans an increase in March.

Buick plans making 11,000 cars this month and will probably do so now that it works five days a week on an approximate 500 cars daily. February saw this division of General Motors making about 8000.

Oakland-Pontiac is making 500 Pontiacs and 150 Oaklands daily, and March will show almost 13,000 cars turned out, compared with 10,000 for February.

Willys-Overland is now operating five days, having stepped up its operation another day to get the 13,000 proposed cars from the plant that it has tentative for March. This would be approximately a 40 per cent increase over the 7000 turned out in February. Of the daily production, about 70 per cent are Willys, the remainder Knights.

Next, at 200 to 300 units daily, is Chrysler unchanged at 250 a day, but only 3 days. Chrysler recently received a large order for taxicabs.

In the same bracket are two Chrysler subsidiaries: Dodge making 480 daily, both trucks and passenger units; Plymouth busy on 300 daily, 4 days, having just increased dealers' commissions. Olds is at 340 daily, 5 days, a slight betterment over a fortnight ago.

Down the line to the next classification are those makers at 100 to 200 units daily, headed by DeSoto and Graham-Paige, each making an approximate 150 daily, four days. The Cadillac-LaSalle division intends making 2500 cars in March and its 113 cars daily 5 days a week are split between 40 LaSalles, 40 Cadillac 8's 30 Cadillac 12's and two to three Cadillac 16's.

Packard makes about 330 cars a week, or 80 to 85 daily, 4 days. Hupp reports 150 units, mostly 8's being assembled 5 days the week at both Cleveland and Detroit.

Those makers under 50 a day include Reo, 40 to 45 units, 5 days; Lincoln, 25 to 30, 5 days; Marmon, 50, 5 days; Pierce-Arrow, 30, 5 days.

◆

The new DeVaux gets into production about March 20. Orders for bodies and fenders already have been placed with Hayes Body Corp.; Continental Motors makes the engines; Toledo Steel Products is making the valves; and, as mentioned, City Auto Stamping Co. is producing an introductory order of radiator shells. DeVaux manufacturing is to be done in an unused wing of the Hayes Body Corp. at Grand Rapids.

Reo has announced intention of raising the price after April 1 on the 8-cylinder Royale model introduced last October. The increase will be an approximate $300. Still hinted at are changes pending to come in the Flying Cloud Reo about the same time as the new price goes into effect.

Newton Is Reopening

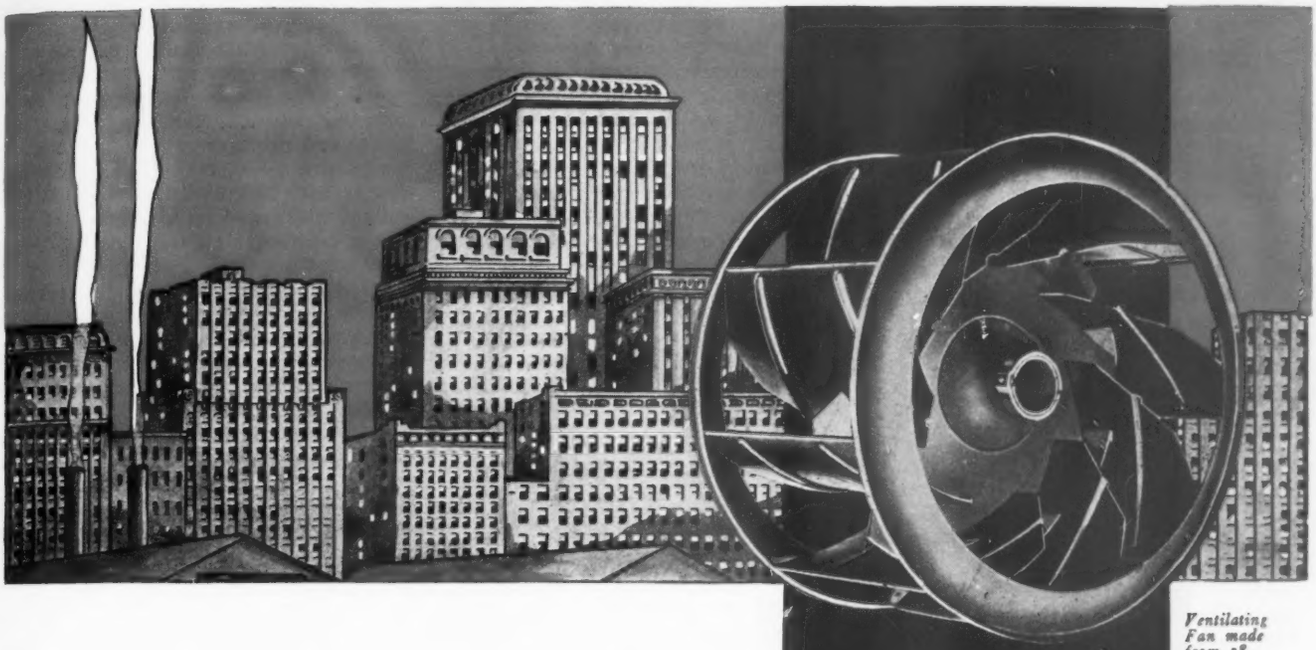
Newton Steel Co. has been running cold mills at its practically unused Monroe, Mich., plant since March 1. Hot-rolled sheets from Newton Falls have been shipped to Monroe for finishing. However, on March 16 several hot mills at the Monroe plant were started up.

Ford is using cold pig in his open hearths, his hot mixer being now out of commission. With the new 400-ton open hearth, however, will be provided two 600-ton mixers.

Whenever Ford gets to 9000 to 10,000 assembly units daily, he is said to be in a position that he must turn to outside sources for his pig iron. However, this daily assembly production is such a relatively rare occurrence and the Ford melting practice has been to store such large stocks of pig in slack times that he has rarely had to turn to other sources.

Outside interests are selling Ford some silvery grades of iron for him to build up his silicon analysis. A change has occurred in foundry practice at Ford within recent date, when he has turned from making silicon iron in his blast furnaces to other grades.

Last year Ford offered 75,000 tons of silicon iron for sale. Late in 1930 he began to accumulate iron and as stocks exist today with one furnace blowing, he has enough pig stocked to go through the balance of 1931 at 10,000 cars daily without resorting to outside interests.



Ventilating Fan made from 18 Sheet 2. Steel

CROSBY
SHEET METAL STAMPINGS

1896
35 YEARS IN BUSINESS
1931

OUR THIRTY-FIVE YEARS' uninterrupted progress under the same management is your guarantee of dependable and highly satisfactory stamping service.

Our experience covers a very wide range of work in various types of steel including zinc, brass, copper, duralumin and aluminum.

Send us your Blue Prints or Samples.

The Crosby Company
General Offices and Works: Buffalo, N. Y.

BRANCH OFFICES:
Chicago Detroit Cleveland New York
Philadelphia

AmbitiousProgramLaunched by Scrap Institute

(*Concluded from Page* 17)

indicated the passing of the former attitude of secrecy maintained by most dealers. From this it is evident that it will not be difficult to obtain much information of this sort for compilation of the cost manual which is one of the objects the institute seeks.

M. V. Bonomo, Jersey City, N. J., set his costs at $3.33 per gross ton, with a further sales deduction of 20 cents per ton for shortages, rejections and demurrage. He analyzed this total into its various items of direct labor and overhead. These costs were based on 44,000 tons of material, of which 42,200 tons was steel and iron scrap.

Harry N. Cohn, Butler, Pa., describing his new and modern scrap plant, placed his costs at $3.25 per gross ton and on two months of operation this year, at about 50 per cent capacity, a profit was made. Discussion brought to light some skepticism as to his figures but he maintained them in the face of all questions.

Profit Easily Becomes Loss

Lee J. Workum, Portsmouth, O., argued for exact methods in determining costs of yard operations in preparing scrap and showed how a supposed profit may be a real loss when accurate figures are not kept to show actual conditions. He recommended the appointment of a national committee to study the situation and prepare a simplified manual or set of forms, easy to understand and applicable to all territories and all types of iron yard operation.

F. H. Figsby, of New York, speaking at the round table on costs, held that costs are more important than prices obtained from scrap. He asserted that large profits are the result of foresight and control; loss and waste mark avoidable incidents or accidents; better understanding of business comes from better understanding of costs. To get value from study of costs, competitors must compare their costs on a uniform basis, which presupposes a uniform cost system for all handlers of scrap. Progressive men who have studied their costs are ready to exchange information with others for the common good.

Scrapping automobiles came in for much discussion at a special session and the plan of the institute to aid in disposing of old cars was outlined. It is a fact that there is no profit in scrapping automobiles but the best interests of the automobile industry and a measure of conservation dictate that they be reduced to that condition and removed when their usefulness has passed. At present wreckers remove the more valuable parts but the remainder is not thrown into the scrap stream.

The institute proposes to form an alliance with important automobile manufacturers to make institute members official destroyers of old cars turned over to them by dealers and on a certificate of complete destruction by the scrap dealer a bonus is paid by the manufacturer. At present too many cars sold by dealers for scrapping are rejuvenated sufficiently to be resold as used cars and replaced on the road. Further negotiations will be carried on to bring about this arrangement.

An interesting session of the convention was devoted to informal reports of methods followed by each of the 13 chapters. Each has its local and peculiar problems and each is free to solve them in its own way. In the far Northwest officers of the chapter engaged an airplane and put on a membership campaign that was successful.

The New Jersey chapter turned much attention to social gatherings with the result that better acquaintance was developed and old suspicions and fears were eliminated to a great degree.

The southern chapter plans to have representatives of consumers on an executive committee with dealers, thereby breaking down lines of separation. The Cincinnati chapter has been following a study of costs and is seeking to devise an inspection bureau backed by consumers and dealers jointly.

F. W. Thurnau, Inter-Ocean Syndicate, Chicago, speaking to the research round table meeting, said that if the iron and steel scrap industry does not meet an economic need, it is doomed to pass out of existence.

That the Institute of Scrap Iron and Steel, an infant in trade organizations, in three years should have made the progress it has made is further evidence that this industry is meeting an economic need.

If the scrap industry is to continue to serve and further broaden its activities, it must do so through winning public confidence. This involves constructive planning and education of the public, the presentation of facts regarding the industry and its activities.

Maintain Trade Relations Work

Work of the trade relations bureau was carried on daily during the convention in the tribunal set up near the convention hall. The work of this bureau is performed by the local chapter committees or passes on up to the institute committee. Violators of the trade practice code may be expelled and if the case seems sufficiently serious it may be brought to the attention of the federal trade commission. Expulsions have been made but no cases have been sent to the commission.

Arbitration is compulsory among members of the institute and disagreements among members are kept out of the courts. Facilities of arbitration are available to nonmembers also. Two steel companies are parties to an arbitration now by voluntary submission.

At the banquet closing the convention the address of the evening was by Rabbi Barnett R. Brickner of the Euclid Avenue temple, Cleveland, on "Can a business man afford a conscience?"

Objectives in 5-Year Plan For Scrap Industry

RECOMMENDATIONS epitomizing the five-year plan for stabilizing the steel and iron scrap industry, as enunciated by Director General Schwartz, are as follows:

1. *That the department of commerce be requested to make a survey of the marketing and distributing machinery of the industry to determine sources of scrap, normal outlets and channels of distribution.*

2. *That a commission be appointed by the institute to consist of dealers, consumers, producers and those governmental agencies interested in conservation of iron ore resources, the duties of this commission being to hold hearings, assist in the department of commerce survey and develop a marketing plan for the industry.*

3. *That immediate steps be taken to plan mergers.*

4. *That a trade promotion bureau be organized by the institute under the direction of a technical man who will carry on research activities and undertake to develop markets for alloy steel scrap and to increase the conservation of natural resources.*

5. *That an advertising campaign be planned to establish the seal and membership in the institute as a guide for purchasers and producers of scrap.*

6. *That an export association be organized under the Webb-Pomerene law.*

7. *That a cost survey be made to establish a cost manual as part of the educational program of the institute.*

8. *That negotiations with the American Iron and Steel institute represented by a committee consisting of James E. Farrell, L. E. Block and Eugene Grace, be speeded up with the ultimate aim of bringing the leaders of the steel industry to a realization that the elimination of the scrap iron dealer is against their own interests and against the national welfare.*

Prices Up; 146,484 Tons Shapes Let

Rockefeller Interests Place 125,000 Tons for "Radio City", Record Award—$1 Rise In Heavy Steel Confirmed—New Contracting Slow—Iron Wavers

CARNEGIE STEEL CO., amplifying its price announcement on steel bars, plates and shapes, will write second quarter contracts at 1.65c, Pittsburgh, until April 1, when the market becomes 1.70c.

Since first quarter contracts generally were based upon 1.60c and the current open market price is 1.65c, the advance of $1 per ton for the second quarter as reported here exclusively last week is confirmed.

This clarification of the price situation in heavy finished steel is expected to be followed by active solicitation of contracts. Presumably, other producers will adopt 1.65c as their contract price.

All makers of wire have followed the American Steel & Wire Co.'s advance of $2 per ton in all wire products except fencing and bale ties. On hot and cold-rolled strip the rise of $1 and $2, respectively, also has been made general.

Obviously on heavy finished steel, and on wire and strip as well, the new prices have not been tested. With further expansion in requirements for steel almost negligible, consumers have been indifferent to second quarter contracts. Some doubt whether prices will be tested before the turn of the quarter.

As demand tends to slow down from the bulge of January and February, the market situation is more irregular. Important grades of scrap at Pittsburgh have been marked down 25 to 50 cents this week, sheets have been shaded in the East, and at Cleveland pig iron has been reduced 50 cents per ton.

On the other hand, southern producers of pig iron have advanced their price 50 cents on northern shipments, Mahoning valley prices on pig iron have become stabilized at $17, and all makers of wire rods now quote $37. The net result of these variations is to lift STEEL's market composite 10 cents, to $31.71.

The 125,000 tons of steel, chiefly structurals, for the Rockefeller "radio city" in New York is being placed with the United States Steel Corp. This is probably the largest structural award for one specific job in the history of the fabricating industry. With other smaller awards it makes this week's structural total 146,484 tons, also a record. For the year to date structural awards thus total 470,012 tons, against 398,722 tons in the comparable period of 1930. The Pennsylvania railroad opens bids March 23 on 100,000 tons of steel, principally for its electrification program.

In addition to the 20,000 tons of 26-inch steel pipe awarded to the A. O. Smith Corp., Milwaukee, last week, by the Southern Fuel Co., Los Angeles, 12,000 tons additional has been placed with this interest and 18,000 tons with the Western Pipe & Steel Co.

Automotive requirements for steel continue to expand moderately, but the gait is slower than the expansion in sentiment at Detroit. Under pressure, autobody sheets have been shaded $2 per ton at Detroit. Railroad participation in the markets is light, rail releases being sufficient only for 55 per cent rail mill operations and the only noteworthy equipment buying being 500 underframes placed by the Northern Pacific. In one instance tie plates have been shaded. Farm implement manufacturers continue handicapped by large inventories of finished machines.

February sales of sheets by independent mills increased 3 per cent on a daily basis, production advanced 26 per cent and shipments 16 per cent.

By April 1 Lake Superior iron ore producers are expected to quote on the first inquiry of the season, that of the Ford Motor Co., with reaffirmation of 1930 prices expected.

Warehouses in New York have revised quantity extras to combat foreign competition.

Steelmaking operations have gained about one point this week, being just under 57 per cent. Pittsburgh is unchanged at 50 per cent and Birmingham at 65. Eastern Pennsylvania is off 2 points to 51 and Buffalo is down 3 points to 51. Chicago at 60 per cent is up 2½ points, Youngstown at 51 is up 1, and Cleveland at 70 is up 5.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (March 18, 1931)	**$31.71**
Last week (March 11, 1931)	**31.61**
One month ago (February, 1931)	**31.65**
Three months ago (December, 1930)	**31.74**
One year ago (March, 1930)	**34.95**
Ten years ago (March, 1921)	**45.37**

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	March 18, 1931	Feb. 1931	Dec. 1930	Mar. 1930
PIG IRON				
Bessemer, del. Pittsburgh	$18.26	18.51	18.76	20.76
Basic, valley	17.00	16.75	17.00	18.50
Basic, eastern del. eastern Pa.	17.50	17.25	17.50	18.80
No. 2 foundry, del. Pittsburgh	17.76	18.01	18.26	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	19.50
*Southern No. 2, Birmingham	13.00	13.00	14.00	14.50
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	18.26	18.26	18.26	20.76
Malleable, valley	17.00	17.25	17.50	19.00
Malleable, Chicago	17.50	17.50	17.50	19.50
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	25.04
Gray forge, del. Pittsburgh	17.63	17.38	17.63	19.13
Ferromanganese, del. Pittsburgh	89.79	89.79	93.29	103.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.50	2.50	2.50	2.60
Connellsville foundry, ovens	3.25	3.25	3.50	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	30.00	30.50	33.00
Sheet bars, open-hearth, Pitts.	30.00	30.00	30.50	33.00
Billets, open-hearth, Pittsburgh	30.00	30.00	30.50	33.00
Wire rods, Pittsburgh	37.00	35.00	35.50	38.00

	March 18, 1931	Feb. 1931	Dec. 1930	Mar. 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.65	1.65	1.60	1.85
Steel bars, Chicago	1.70	1.70	1.70	1.90
Steel bars, Philadelphia	1.94	1.94	1.89	2.27
Iron bars, Chicago	1.70	1.75	1.70	1.95
Shapes, Pittsburgh	1.60	1.60	1.60	1.80
Shapes, Philadelphia	1.81	1.81	1.76	2.01
Shapes, Chicago	1.70	1.70	1.70	1.90
Tank plates, Pittsburgh	1.65	1.65	1.60	1.85
Tank plates, Philadelphia	1.80½	1.80½	1.80½	2.10
Tank plates, Chicago	1.70	1.70	1.70	1.90
Sheets, blue anl., No. 13, Pitts.	2.05	2.05	2.05	2.25
Sheets, black, No. 24, Pitts.	2.35	2.35	2.35	2.65
Sheets, gal., No. 24, Pittsburgh	2.90	2.90	2.90	3.30
Sheets, black, No. 24, Chicago	2.50	2.50	2.50	2.80
Sheets, blue anl., No. 13, Chicago	2.20	2.20	2.25	2.40
Sheets, galvanized, No. 24, Chi.	3.05	3.05	3.15	3.45
Plain wire, Pittsburgh	2.20	2.20	2.25	2.40
Wire nails, Pittsburgh	1.90	1.90	1.90	2.30
Tin plate, per base box, Pitts.	5.00	5.00	5.00	5.25
SCRAP				
Heavy melting steel, Pitts.	13.00	12.75	12.75	16.60
Heavy melting steel, eastern Pa.	10.50	10.50	11.00	16.25
Heavy melting steel, Chicago	9.75	9.85	10.00	13.20
No. 1 wrought, eastern Pa.	11.00	12.50	13.50	16.25
No. 1 wrought, Chicago	9.00	9.25	10.00	13.50
Rails for rolling, Chicago	12.00	12.10	13.00	15.00

Sheets

Prices Extended for Second Quarter—Western Mills Step Operations Up to 70 Per Cent

SHEET PRICES, PAGE 71

Youngstown, O.—Sheet mills are operating at practically unchanged rates, with quotations for second quarter the same as those now current. Important consumers are slowly accepting the second quarter price schedule and at the moment it promises to prevail, embracing common black at 2.35c, Pittsburgh; galvanized at 2.90c; autobody at 3.30c; furniture at 3.60c, and blue annealed 1.90c to 2.05c, depending upon the gage. Autobody sheet mills are continuing to take the bulk of the orders placed in the valley, and are operating around 70 per cent. Consumers of special sheets such as nonrust, and electrical are placing a fair run of orders.

New York—Little variation is noted in sheet buying, the volume continuing light. Prices are unchanged for second quarter. Galvanized are 2.90c, Pittsburgh, to jobbers, with occasional concessions of $1 a ton; and 3.00c to the general trade.

Philadelphia—Listless demand is resulting in an easier market for sheets. Galvanized are 2.85c to 2.90c, Pittsburgh. Black are 2.35c, with concessions of $1 or more in numerous instances. Blue annealed are easy at 1.90c and 2.05c. A consumer in this district closed for approximately 150 tons of galvanized for delivery into the third quarter.

Buffalo—Somewhat larger sheet inquiry is reported from Canadian consumers who have been out of the market for about three months following heavy purchases before the new dominion tariff went into effect late in 1930.

Pittsburgh—Sheet sales continue to drag with current activity little changed from the rate of the past several weeks. Orders are mainly for small lots and consumers are taking little interest in new contracts. Present prices are being continued for second quarter, the market being unchanged at 2.35c, Pittsburgh, for black sheets; 2.90c for galvanized; 2.05c for No. 13 gage blue annealed, 1.90c for Nos. 9 and 10 gage blue annealed, and 3.30c for autobody. Releases from automotive users are slightly heavier than a month ago.

Cleveland—Sheet steel sellers are quietly extending current prices into the second quarter, though inquiry is practically nil. Galvanized is being sold at 2.90c, Pittsburgh, an attempt to raise the figure to 3.00c, having failed. A possible effort is rumored to be in the offing to raise several sheet prices after the second quarter gets under way. Current sales show continued depression, despite a slight expansion from the furniture manufacturers at Jamestown, N. Y., and a better interest from local barrel manufacturers. The Higbee Co. department store will take approximately $200,000 worth of store fixtures, though sheets have been placed for elevators and partitions. A rumored weakness to 3.20c on autobody is reported. Prices are unchanged at 2.35c, Pittsburgh on black; 3.30c for autobody; and 3.60c, for metal furniture stock, base Pittsburgh.

Cincinnati—Sheet mills in this district report orders have led to an increase in production to above 60 per cent. Quotations on autobody sheets have been cut to 3.20c, base, Pittsburgh.

Chicago—Western sheet mills have made further improvement in operations, reaching 70 per cent for the week. A steadier volume of orders makes operating conditions easier. A leading independent has five of its ten mills active at Milwaukee and all in operation at Indiana Harbor. Only a few second quarter contracts have been signed. Prices for that period remain unchanged at 3.00c, mills, for No. 24 galvanized; 2.45c for No. 24 black, and 2.00c for No. 10 blue annealed. It is understood an advance still is being considered for later in the quarter.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh base	2.35c
Philadelphia, delivered	2.64c
Gary, Indiana Harbor	2.45c
Chicago, delivered	2.50c
Birmingham, base	2.50c
St. Louis, del.	2.70½c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.55c to 2.65c
Gary, base	2.65c to 2.75c

GALVANIZED NO. 24

Pittsburgh, base	2.90c
Philadelphia, delivered	3.19c
Chicago, delivered	3.05c
Gary, Indiana Harbor	3.00c
Birmingham, base	3.05c
St. Louis, del.	3.25½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.05c
Chicago, district mills	2.15c
Chicago, delivered	2.20c
St. Louis, delivered	2.40½c
Philadelphia, delivered	2.34c
Birmingham	2.20c to 2.25c

BLUE ANNEALED SHEETS NO. 9-10

Pittsburgh, base	1.90c
Chicago, district mills	2.00c
Chicago, delivered	2.05c
Philadelphia, delivered	2.19c
St. Louis, delivered	2.25½c
Birmingham	2.05c to 2.10c

AUTOMOBILE NO. 20

Pittsburgh, base	3.30c

FURNITURE NO. 24

Pittsburgh, patent leveled..	3.60c

Tin and Terne Plate

Prices per 100 pound box Pittsburgh

Tin plate, coke base	$5.00

Gary, Ind., base 10 cents higher.

(Per pound)

Long ternes, 24, unassorted	3.25c to 3.35c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.35c and 2.45c
Galvanized wire	2.80c and 2.90c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.20c to 3.30c
Wire, delivered Detroit	2.50c
Nails, delivered Detroit	$2.35

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c
**7/16-inch and smaller, Pitts.	70, 10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Steel Plates

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.80½c to 1.85½c
New York, delivered	1.88c to 1.93c
Boston, delivered	2.00c to 2.05c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Coatesville, Pa., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.05c to 2.15c
St Louis, del	1.95½c

Structural Shapes

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.76c to 1.81c
New York, del.	1.905c
Boston, del.	1.985c to 2.035c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham, base	1.75c to 1.80c
Pacific Coast, c.i.f.	2.15c to 2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.60c to 1.65c
Chicago, base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.25c
Cleveland, base	165c to 1.70c
Philadelphia, del.	1.94c
New York, del.	1.98c
Boston, del.	2.05c
Pittsburgh, cold finish	1.75c to 1.80c
Pittsburgh, forg. qual.	1.85c to 1.90c

RAIL STEEL

Chicago Heights	1.60c to 1.65c
Eastern mills	1.65c

IRON

Chicago, base	1.70c to 1.75c
New York, delivered	1.93c to 2.03c
Philadelphia, delivered	1.89c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c to 2.00c
Stock lengths, mill	1.65c to 1.75c
Chi. billet	2.00c
Chi., rail steel	1.60c to 1.70c
Chi., rail steel, less carload	1.90c
Philadelphia, cut lengths	2.19c
Cleveland, cut lengths	1.95c to 2.05c

Cold Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni.	1.05
2100	0.55	5100 .80 - 1.10 Cr.	0.45
2300	1.50	51.00 Cr. spring	0.20
2500	2.25	6100 bars	1.20
3100	0.55	6100 Spring	0.95
3200	1.35	Cr., Ni., Van.	1.50
3300	3.80	Carbon Van.	0.95
3400	3.20	9250 (flats)	0.25
4100 .15 to .25 Mo.	0.50	9250 (rds.,sq.)	0.50
4600 .20 to .30 Mo.			

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.65c to 1.70c
Hot strip 6 1/16 to 24-in. Pitts.	1.55c to 1.60c
Hot strip, bands 6 in. and under, Chicago	1.75c to 1.80c
Do. 6 1/16 to 24 in.	1.65c to 1.70c
Cooperage hoop, Pitts.	1.90c to 2.00c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.25c to 2.35c
Worcester, 3 tons, over	2.40c to 2.50c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.80c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.80c
Spikes boat, barge, Pitts.	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 73 off

Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.

Eagle list ..... 73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 73 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 73 off

HEXAGON CAP SCREWS

Milled ..... 80-10-10-5 off

Upset 1 in. diam. and smaller ..... 85-10 off

SQUARE HEAD SET SCREWS

Milled ..... 80-5 off

Upset 1 in. and smaller ..... 80-10-5 off

Upset, larger than 1 in. ..... 80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh	2.40c

do, less carloads, 5 kegs or over, 2.65c; and less than 5 kegs, 2.80c.

Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Advanced Second Quarter Price Not Yet Tested—Specifications Show Moderate Increase

BAR PRICES, PAGE 71

Chicago—Finished steel producers are expected shortly to name second quarter prices on the basis of 1.75c, Chicago, for bars and other heavy products. Specifications the last two weeks have been about 25 per cent ahead of the January average. Sales are largely for nearby delivery, in small quantities. Occasional inquiries are noted for second quarter, but as mills have not opened books, there are no orders for that period except protections extended on pending work. Implement business is extremely quiet. Soft steel bar mills are slightly above 60 per cent, alloy mills are operating near 50, and rail steel bar mills about 75 per cent.

New York—Most leading sellers have opened second quarter books on steel bars with 1.65c, Pittsburgh, as a minimum. Most new business is moving at this figure. Specifications are slightly improved.

Philadelphia—Nearly all bar sellers have opened books for second quarter at 1.65c, Pittsburgh. This is equivalent to the current market on new business and $1 higher than the contract price for the quarter now ending. Trading generally is quiet.

Cleveland—Second quarter Cleveland base price has been named at 1.70c, Cleveland, for both local and outside delivery. As yet, however, there has been practically no interest in this period. Announcement of this price will presumably abolish the 1.65c to 1.70c spread of bars at Cleveland, making the minimum 1.70c. Sales over the past week were moderately good. Alloy base price at 2.65c, f.o.b. mill, is unchanged.

Youngstown, O.—All makers of steel bars in this district have advanced their minimum quotation by $1 a ton to the second quarter delivery base of 1.65c, Pittsburgh. Sales of small lots are being made at the flat price of 1.65c but new business is declared to be only routine and is small in the aggregate. Alloy steel bars are in better demand with Canton and Massillon mills having each five open hearths in operation, as for several weeks.

Pittsburgh—Independent bar producers are following the lead of the Carnegie Steel Co. in announcing a minimum of 1.65c, Pittsburgh, on steel bars for second quarter. In most cases this represents an advance of $1 a ton over first quarter contracts. The new figure as yet is untested, consumers generally showing little interest in new contracts.

Birmingham, Ala.—Advance in base price to 1.80c on steel bars has been announced.

Cold-Finished Bar Users Slow to Contract

Cold Finished Prices, Page 71

Pittsburgh—Shipments of cold-finished steel bars are holding moderately above the rate a month ago, reflecting the increase in automotive operations but also influenced by a more diversified demand from other consumers. Second-quarter contracting is rather slow, with books for that period open at prices unchanged at 2.10c, Pittsburgh. Cold-finished bar producers are in a more favorable position than a year ago as regards the spread between the price of their products and that of hot bars, the current differential of $9 a ton comparing with $5 a ton a year ago. Producers continue to name 2.10c in the open market.

Cleveland—The cold-finished steel bar market is quiet with 2.10c, Cleveland, being named now for second-quarter by all sellers. Little interest, however, is manifest for that period and current releases aside from contract consumers, are inconsequential. Automobile parts makers locally show a slight improvement, though the movement is not marked.

Plates

New Orders Slightly Heavier—Tank Inquiry Promising—Mills Name Second Quarter Prices

PLATE PRICES, PAGE 71

Chicago—Despite the depression in the oil industry about 2000 tons of plates have been ordered out by fabricators for tank work in the new East Texas area, and about 500 tons for other points in the Southwest. Skelp shipments for pipe lines are 35,000 to 40,000 tons monthly. Second quarter contracting has not been started formally, but protections on the basis of 1.70c to 1.75c, Chicago, have been extended on several pending projects. Potential oil tank inquiry require about 10,000 tons, depending upon early future operations in the oil country. Plate mill activity is about 75 per cent.

New York—Some plate sellers have announced 1.75c, base, Coatesville, Pa., as minimum for second quarter, and others are expected to take similar action. Meanwhile, the market is 1.70c to 1.75c, with a firming tendency. Interest is centered in 7500 to 8000 tons of plates for caisson work for the west side warehouse terminal, bids to be opened March 24.

Philadelphia—Plate inquiry is featureless and trading is less active than two weeks ago. One eastern maker has announced 1.75c, base, Coatesville, Pa., as its second quarter price. This is a continuation of the price quoted on a fair percentage of current new business, but an advance of $1 a ton over the usual billing price for this quarter. Other eastern mills are expected to take similar action.

Pittsburgh—Plate producers generally are naming a minimum price of 1.65c, Pittsburgh, for second quarter, or an advance of $1 a ton over the figure applying on most of the first quarter contracts. Contracting so far is light and the advance has not been provided a test. Recent specifications show improvement and incoming business is slightly heavier than a month ago. The barge market currently is quiet with a fair volume of business represented in pending work.

Cleveland—Several lake freighters are in Cleveland awaiting repair and a large fleet is in harbor at Fairport, O., for minor work. The Steamer GALLAGHER, Midland Steamship Line, will take 300 tons of plates for a tank top and the steamer POLLOCK of the same line will take 350 tons for a tank top. One seller of plates reports fairly heavy inquiry for second quarter price by fabricators figuring tank and boiler jobs. Thunder Bay Quarries Co. has awarded 1000 tons of sheet piling for its docks at Alpena, Mich to the Carnegie Steel Co. Syracuse Lighting Co. has placed an order with the Stacey Engineering Co., Columbus, O., for a large tonnage of plates for a gas holder to be 300 feet high and 200 feet in radius. Plates will be placed with

a western mill. The 1.65c, Pittsburgh, price is reported holding on all purchasing not under contract for first quarter. Sellers, with one exception, defer announcement of price for second quarter.

War department has supplemented a local bond issue of $3,250,000 with a federal appropriation of $400,000 for improvement of the Cuyahoga river, meaning engineers can proceed with drafting detailed plans. A large amount of sheet piling will be needed.

Contracts Placed

30,000 tons, 26-inch gas pipe for Souther Fuel Co., Los Angeles, allocated as follows: To Western Pipe & Steel Co., Los Angeles, 76 miles, or 18,000 tons; to A. O. Smith Corp., Milwaukee, 53 miles, or 12,000 tons.

1000 tons, sheet piling, Alpena, Mich., docks for Thunder Bay Quarries Co., subsidiary of Diamond Alkali Co., Fairport, O., to Carnegie Steel Co., Pittsburgh.

650 tons, two tank tops, steamers GALLAGHER and POLLOCK, Midland Steamship lines; ships at Cleveland; work probably to be done by a Cleveland shipyard.

300 tons, 3 barges for United States engineers, Mobile, Ala., district, to Midland Barge Co., Midland, Pa.

100 tons or more, tanks for plant of Valvoline Oil Co., Linnton, Oreg., to Steel Tank & Pipe Co., Portland.

100 tons, sheet steel piling, substructure federal building, Seattle, to Bethlehem Steel Co., Seattle.

Unstated tonnage, gas holder, Syracuse, N.Y., for Syracuse Lighting Co., with Stacey Engineering Co., Columbus, O. Holder to be 300 feet high and 200 feet in radius.

Contracts Pending

4500 tons, 24 to 36-inch welded steel pipe, Los Angeles. Bids received.

1500 tons, 2 car floats for Inland Waterways Corp.; McClintic-Marshall Corp., Bethlehem, Pa., low.

210 tons, 20-inch welded steel pipe, Oakland, Calif., Steel Tank & Pipe Co., Berkeley, Calif., low.

Unstated tonnage, for 20 standard coal barges for Warner Coal Co., Cleveland; each barge will take approximate 150 tons of plates and shapes. Project held in abeyance.

Unstated tonnage, 14 steel dredge pontoons, United States engineers, St. Louis; bids March 25.

Semifinished Demand Slow; Wire Rods Advanced $2

Semifinished Prices, Page 82

Pittsburgh—Semifinished steel demand shows little change from the rate of recent weeks and continues slow. Producers have made no announcement regarding second quarter prices although recent buying has been confined to such an extent to spot purchases that there has been little occasion to formally open books for new contracts. Wire rods are an exception, being included under the $2 advance announced on wire products, bringing the price to $37 for second quarter. Rerolling billets, slabs and sheet bars continue $30 with forging billets $36.

Philadelphia—Rerolling billets are quiet, at $30, base, Pittsburgh. Forging billets are quoted $35, with occasional small sales at $36. Sellers are announcing an advance of $2 a ton on wire rods for second. Other prices of semifinished steel are to continue unchanged for that period, according to present indications.

Youngstown, O.—Books have been opened for second quarter business in billets, sheet bars and slabs, but buyers are slow to place orders. This appears due mainly to irregular operations of nonintegrated independent mills rolling sheets. Billets, sheet bars and slabs hold at $30, Pittsburgh and Youngstown, while wire rods are holding to the recent $2 advance to $37, Pittsburgh and Cleveland.

Independent open hearths are operating around 57 per cent of capacity, with 29 units active this week out of a total of 51.

Cleveland — Semifinished steel specifications have increased slightly, the leading merchant producer here adding another open hearth, now operating nine of 14 units. No change in prices from $30, base, Cleveland and Youngstown, O., is anticipated on sheet bars, billets and slabs for second quarter. Consumers are not contracting, but ordering material as needed.

Railroads

Rail Releases Steady—Fastenings Sales Light in West—Pennsylvania Seeks 67 Locomotives

TRACK MATERIAL PRICES, PAGE 71

New York — The Pennsylvania railroad is inquiring for second-quarter steel pipe and boiler tubes, bids March 31. Norfolk & Western is inquiring for second-quarter steel tires. Foreign dispatches say the Soviet is negotiating with German National Railways for the purchase of 500 locomotives and 10,000 cars now idle in German yards. Cars and locomotives would have to be altered to conform to the Russian gage.

Pittsburgh — Westinghouse Electric & Mfg. Co. is expected to share prominently in an award of 69 electric locomotives by the Pennsylvania railroad for the electrification program to be carried out between New York and Washington.

Cleveland—The Nickel Plate allocation involved about 22,000 tons of rails, instead of 27,400 tons as reported previously. In addition, this railroad has option on approximately 6000 more tons of rails. The spikes and fastenings incidental to this order have been also awarded among unstated interests. Approximately 5000 tons of fastenings are included.

Chicago—Despite the lack of inquiry for rails, it is expected that the five or six western roads that still have not placed 1931 business may come into the market shortly. Western Pacific has asked the interstate commerce commission for further time to complete the building of its recently authorized 39-mile extension from San Francisco through Redwood City to Niles, Calif. Releases for rails are liberal enough to keep the district's rail mill capacity at about 55 per cent. Track accessory releases also are active. Sales of tie plates, spikes, bolts and angle bars during the week totaled 1500 tons in miscellaneous lots. Northern Pacific has awarded 500 underframes for stock cars to be built in its St. Paul shops. American Steel Foundries Simplex plant at Hammond, Ind., has booked an order for its clasp brake department to provide brakes for 1050 90-ton steel cars for the Bessemer & Lake Erie railroad.

Car Orders Placed

Chicago, South Shore & South Bend, repairs to five gondolas, to Ryan Car Co., Hegewisch, Ill.

Northern Pacific, 500 underframes for stock cars to Siems-Stembel Co., St. Paul, subsidiary of Standard Steel Car Co.

Union railroad, ten air-dump cars, to Differential Steel Car Co., Findlay, O.; and ten air-dump cars to Magor Car Co., Passaic, N. J.

Uruguayan State Railways, 5 combination passenger and baggage, gasoline rail motor cars, to J. G. Brill Co., Philadelphia.

Rail Orders Placed

Nickel Plate, 22,000 tons of rails with additional 6000 tons on option, four ways among Bethlehem Steel Co., Inland Steel Co., Illinois Steel Co. and Carnegie Steel Co. Fastenings have also been placed involving approximately 5000 tons.

Rail Orders Pending

Board of transportation, New York, 5500 tons rails, expected to be placed in two weeks time.

Structural Shapes

Radio City Taking 125,000 Tons Shapes Goes to Steel Corporation, Reported Largest Single Award Ever Placed—100,000 Tons for Pennsylvania Pending

STRUCTURAL SHAPE PRICES, PAGE 71

New York—"Radio City," a $250,000,000 development of the Rockefellers in the heart of New York City, is taking 125,000 tons of structural shapes from the United States Steel Corp., through Todd & Brown Inc., general contractor. It is presumed this will be fabricated by American Bridge Co., Corporation subsidiary. The model city will be composed of nine units from East Forty-eighth to East Fifty-first street between Fifth and Sixth avenues, New York.

New railway stations at Newark, N. J., and Philadelphia, more than a dozen bridges, a viaduct at Newark, and a large tonnage of steel for electrification between New York and Washington, are included in the 100,000-ton inquiry on which the Pennsylvania railroad will take bids March 23. Detailed specifications include considerable silicon steel for bridge trusses and copper bearing steel for bridge flooring. Requirements call for 18,000 tons of plain H columns, 19,000 tons fabricated H columns, 2000 tons box poles, 6000 tons steel crossarms, 8000 tons steel cross beams, 3000 tons steel sag beams, 7000 tons for signal bridges, 1000 tons transmission towers, 6000 tons substation steel, 6000 tons, same including gratings.

The Structural Steel Board of Trade reports February lettings were 13,641 tons, compared with 21,955 tons in January and 38,535 tons in February, 1930. Engineering and subway construction are not included.

Philadelphia—Shape sellers are quoting 1.75c, mill, on most new business. Price is expected to be subjected to greater test shortly with second-quarter contracts up for consideration. Dominating inquiry is 100,000 tons for the Pennsylvania railroad, on which bids are to be opened March 23. Also pending are 13,000 tons for government hangars on which Belmont Iron Works, Philadelphia, and Ingalls Iron Works, Birmingham, Ala., are low.

Pittsburgh—Structural steel is quiet and fabricators are unable to add to their backlogs. Current activity is made up mostly of small lots. Inquiry for small projects are slightly more numerous.

Cleveland—Sellers have in every instance except one named 1.65c, Pittsburgh, as the going figure for second quarter though the price is denied test through lack of customer interest. The largest award this week was 880 tons for the foot and traffic bridges, West Third street, for this city, which went to Massillon division of Fort Pitt Bridge Works, Pittsburgh.

Chicago—Structural mill operations are above 50 per cent, reflecting gains in the last two weeks that have been due in part to the start of rolling shapes for the new Indiana Harbor continuous strip and plate mill building. In view of the light, short-range buying, and absence of second quarter price announcement, the range for plain material is nominal at 1.70c to 1.75c, Chicago. Awards were 6500 tons, including 5000 tons for the Santa Fe railroad. Fresh inquiries total about 5000 tons.

Contracts Placed

125,000 tons, Metropolitan Square-Radio City development, New York; office building, theatres, broadcasting studios, nine units, 48th to 51st streets, between Sixth and Fifth avenues, to the United States Steel Corp., New York, through Todd & Brown Inc., general contractor.

5000 tons, bridge work for Santa Fe railroad to American Bridge Co., Chicago.

2500 tons, Alpena, Mich., for Thunder Bay Quarries Co., subsidiary of Diamond Alkali Co., Fairport, O., to Whitehead & Kales, Detroit.

2420 tons, additional work, Safe Harbor, Pa., for Safe Harbor Power Corp. hydroelectric work, to American Bridge Co., Pittsburgh.

1500 tons, building, Dime Savings Bank, Brooklyn, N. Y., to George A. Just Co., Long Island City, N. Y., through William Kennedy Construction Co., general contractor.

1040 tons, Hackensack river bridge, route 4, sections 3 and 4, Bergen county, N. J., to American Bridge Co.; S. S. Thompson & Co., Red Bank, N. J., general contractor.

900 tons, bridge over Gatineau river, Gatineau Point, Que., for provincial government, to Dominion Bridge Co., Lachine, Que.

880 tons, West Third street bridges, Cleveland, to Fort Pitt Bridge Works, Pittsburgh, through Dawson & Finnan, Cleveland, general contractor at $252,000.

700 tons, apartment, Fleetwood, N. Y., to unstated fabricator.

600 tons, additional for Rosenwald museum, Jackson Park, Chicago, to McClintic-Marshall Co., and Hansell-Elcock Co., Chicago; previously reported as 325 tons to Hansell-Elcock Co.

480 tons, Panama Canal, to Lehigh Structural Steel Co., Allentown, Pa.

450 tons, public school 120, Queensboro Hill, Queens, N. Y., to Easton Structural Steel Co., Easton, Pa.; Crest Engineering Corp., general contractor. Reported let last week to another fabricator.

400 tons, Dillman estate, Detroit, to R. C. Mahon Co., Detroit.

350 tons, high school, Superior, Wis., to Superior Ship Building Co., Superior, Wis.

350 tons, addition, public school 228, avenue S, Brooklyn, N. Y., to B. Schacht & Sons Iron Works, Bronx, N. Y.; Crest Engineering Corp., general contractor.

250 tons, addition to Meier & Frank department store, Portland, Oreg., to Poole & McGonigle, Portland.

250 tons, addition, Ponce de Leon hotel, Roanoke, Va., to Virginia Bridge & Iron Co., Roanoke, Va.

240 tons, bridge over Bell street, Los Angeles, to Pacific Iron & Steel Co., Los Angeles.

225 tons, state bridges, New York, to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, addition, Ohio Public Service Co., Akron, O., to Burger Iron Works, Akron, O., through Carmichael Construction Co., Akron, O. Reported in STEEL for March 12 as going to unstated.

220 tons, bascule bridge, Kaukauna, Wis., to American Bridge Co., Pittsburgh.

220 tons, state highway bridges, Findlay, O., to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, stand pipe, Burlington, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

200 tons, two buildings, National Transit Pump & Machine Co., Oil City, Pa., to Rogers Structural Steel Co., Corry, Pa.

200 tons, 3-story telephone building, Holyoke, Mass., to Haarmann Steel Co., Holyoke; J. G. Roy & Sons Co., Springfield, Mass., general contractors. Reinforcing bars to Concrete Steel Co., Boston.

200 tons, raceland, Framingham, Mass., to Eastern Bridge & Structural Co., Worcester, Mass.

190 tons, borough hall, Glenridge, N. J., to Hudson Structural Iron Works, Jersey City, N. J.

180 tons, plant addition, Ohio Salt Co., Wadsworth, O., to Hiner Structural Steel Co., Canton, O.

180 tons, public school, Philadelphia, to Robinson Iron & Steel Co., Philadelphia.

175 tons, approaches and two bridges, West Third street, Cleveland, to Concrete Steel Co., Pittsburgh.

150 tons, bridge, Russell, Man., for pro-

Awards Compared

	Tons
Awards this week	**146,484**
Awards last week	**41,258**
Awards two weeks ago	**40,546**
Awards this week in 1930	**25,881**
Av. weekly awards, 1930	**35,242**
Av. weekly awards, 1931	**39,168**
Av. weekly awards, Feb.	**26,659**
Total awards to date, 1930	**398,722**
Total awards to date, 1931	**470,012**

vincial government, to Dominion Bridge Co., Winnipeg, Man.

150 tons, addition to market building for city council, Quebec, Que., to Eastern Canada Steel & Iron Co., Quebec, Que.

150 tons, bridge, New Jersey, to Belmont Iron Works, Philadelphia.

150 tons, radio towers for Earl C. Anthony Co., Los Angeles, to Pacific Iron & Steel Co., Los Angeles.

130 tons, shapes and bars, building, Friends' school, Baltimore, to Maryland Steel Products Co., Baltimore; Davis Construction Co., Baltimore, general contractor.

125 tons, Warren, N. H., state bridge, to Albany Bridge Co., Albany, N. Y.

120 tons, state bridge, Montgomery county, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Albany Bridge Construction Co. Inc., general contractor. Truscon Steel Co., Youngstown, O., was awarded 15 tons of reinforcing bars.

112 tons, highway bridge, New York, to Lehigh Structural Steel Co., Allentown, Pa., through Richards Webber Construction Co., Schenectady, N. Y.

112 tons, state bridge, New York, to McCoy Iron Works Inc., Utica, N. Y.; M. A. McCoy, Utica, N. Y., general contractor.

110 tons, state bridge, Hamilton county, N. Y., to American Bridge Co., through Spooner Bridge Construction Corp., Albany, N. Y.

100 tons, packing plant for Raisin Brook Packing Co., Chicago, to Butler Street Foundry & Iron Co., Chicago.

100 tons, miscellaneous marine repair work, Seattle, to Isaacson Iron Works, Seattle.

100 tons, apartment, 230 Fourth street, Bronx, N. Y., to Gus Schlaiers Sons, Bronx.

Contracts Pending

100,000 tons, electrification construction, bridges, new stations and miscellaneous projects, Pennsylvania railroad; bids March 23.

6000 tons, Broad street subway, bids April 7.

3500 tons, market building, Toronto, Ont., for Merchandise Mart Syndicate Ltd., Imperial Bank building, Toronto.

2865 tons, lock and other work, Mississippi river-Atchafalaya river section of the Louisiana-Texas intracoastal waterway at Harvey, La.; bids April 7, United States engineer's office, New Orleans.

2000 tons, Market street subway, Philadelphia; Keystone Construction Co., Philadelphia, low.

1800 tons, Sixth street viaduct, Los Angeles, Calif.

1200 tons, Rosenwald museum, Jackson Park, Chicago, in addition to 600 tons awarded recently.

1000 tons, state bridges, New Jersey.

1000 tons, additional buildings, Pilgrim state hospital, Pioneer station, Long Island, N. Y.

1000 tons, high school, Yonkers, N. Y.

1000 tons, federal building, Springfield, Mass.; general contract to N. P. Severin Co., Chicago, at $633,900.

1000 tons, 20-story building, 8-10 King street, Toronto, Ont., for Canadian Property Holdings Inc.; N. A. Armstrong, Toronto, architect.

600 tons, grain elevator, Missouri, Kansas & Texas railroad, Kansas City, Mo.

600 tons, stadium for Oklahoma Agricultural and Mechanical college, Stillwater, Okla.

500 tons, bridge over Ouachita river, in Louisiana.

500 tons, repairs, highway bridge, Philadelphia.

450 tons, municipal pier, Philadelphia, still pending; reported placed in STEEL for March 12.

400 tons, addition to Rochester, N. Y., schools, bids soon, Rochester board of education.

400 tons, machine shop, Busch Sulzer Diesel Engine Co., St. Louis.

350 tons, Greentree inn, Westchester, Pa.

320 tons, East River Savings Bank, 96th street, New York.

320 tons, pier No. 15, San Francisco; bids March 26.

300 tons, alterations, West Penn theater, Philadelphia.

300 tons, Islais creek bridge, San Francisco; bids April 29.

280 tons, Queen's anchorage, Triboro bridge, New York; bids, department of plants and structures.

525 tons, bridge over Santa Fe tracks near Merced, Calif.; bids April 1.

250 tons, state highway bridge, Marathon county, Wis.; bids close March 25.

200 tons, 6-story loft, Lexington avenue, New York.

200 tons, Buttonwood street bridge, Reading, Pa.; John H. Wickersham, Lancaster, Pa., low on general contract.

150 tons, bridge, Port Elgin, Ont.; bids being received by township clerk, A. A. McKinnon.

150 tons, bridges, Sauk county, Wis.; bids close March 23.

148 tons, roadwork, Louisiana highway commission, Baton Rouge, La.; bids close March 26.

143 tons, roadwork, Louisiana highway commission, Baton Rouge, La.; bids close March 26.

111 tons, bridge, Ventura county, Calif.; bids opened.

110 tons, additional buildings, Pilgrim hospital, Long Island, N. Y.

100 tons, Coldbrook-Swift tunnel, Metropolitan district water supply commission, 20 Somerset street, Boston, Frank E. Winsor, chief engineer. Work also includes 138 tons miscellaneous cast iron, wrought iron and steel.

101 tons, roadwork, Louisiana highway commission, Baton Rouge, La.; bids close March 26.

100 tons, Huron road hospital, East Cleveland, O.; George S. Rider Co., engineer and architect; bids March 20.

Unstated tonnage, elimination three grade crossings, Clarence, N. Y., for New York Central railroad; state public service commission has approved plans.

Unstated tonnage, overhead structure for Erie railroad over Starrin avenue, Buffalo; state public service commission has authorized work to proceed.

Unstated tonnage, for East St. Louis, Ill., station approach; board of public service, St. Louis, receives bids until March 31.

Concrete Bars

Projects Active in South for Figuring, Also Pending Tonnage Heavy in New York—Price Tendency Firm on Small Lots—Awards Headed by 1750-Ton Seattle Plant

REINFORCING BAR PRICES, PAGE 71

Chicago — Numerous reinforcing bar projects are pending. About 6200 tons is being awarded this week, including 1200 tons for Ft. Wayne, Ind., filtration plant, and 5000 tons for Chicago sanitary district sewage treatment works, at Stickney, Ill. Rail steel bars for road work are firm at 1.60c to 1.75c.

Boston—For a new unit for the Massachusetts Institute of Technology 145 tons were placed with Kalman Steel Co. and 275 tons were placed with Joseph T. Ryerson & Son Inc. for a water purifying system plant at Chicopee, Mass.

New York—Pending volume is heavy, limited largely to public work, although general contracts have been let recently calling for more than 1000 tons of private work. Prices are being shaded on large volume contracts. On small lots prices are steadier.

Philadelphia—Reinforcing bar demand is spotty at 1.65c, Pittsburgh, and 2.30c, delivered locally by truck.

Pittsburgh—Activity in reinforcing bars is heavier, but local awards involve only small lots. Pending work is fair. The market remains 1.65c, Pittsburgh, for stock lengths.

Cleveland—Concrete Steel Co. has contract for 149 tons of concrete bars for the West Third street foot and traffic bridges. The 500-ton dam at Springfield, O., is still pending. The John Carroll university job is being refigured, cutting down on two buildings. Huron road hospital, taking largely concrete bars, is out for bid March 20.

New Orleans—Concrete reinforcing bars are active, 2865 tons being up for lock and other construction at

(*Concluded on Page* 79)

Awards Compared

	Tons
Awards this week	**5,324**
Awards last week	**14,112**
Awards two weeks ago	**11,291**
Awards this week in 1930	**6,201**
Av. weekly awards 1930	**6,990**
Av. weekly awards 1931	**7,365**
Av. weekly awards, Feb.	**5,251**
Total awards to date, 1930	**67,815**
Total awards to date, 1931	**88,384**

Strip

Better Buying Developing Slowly—New Prices Only Partially Tested—Production Steady

STRIP PRICES, PAGE 71

Pittsburgh—The recent advance of $1 a ton on hot strip and $2 on cold strip remains to be thoroughly tested. Contracting is slow and although some buyers have signed for second quarter requirements, large users defer making of commitments. The situation is expected to be clarified somewhat this week with the closing on automotive tonnage. Prices named for second quarter are 1.60c and 1.70c for two sizes of hot strip and 2.35c for cold-rolled strip. Specifications equal or exceed the rate of recent weeks and business so far this month continues ahead of the February rate.

Worcester, Mass.—Production of cold-rolled strip took on added strength in the second week of March and promises to give a satisfactory first quarter. Prices have stiffened, advancing from the 2.40c to 2.50c basis to 2.50c to 2.60c, the prevailing quotation. Increases of automobile releases are beginning to be felt.

New York—The slight improvement in strip specifications continues, although business is not brisk. Hot strip may be quoted 1.55c to 1.60c, Pittsburgh, for wide, and 1.65c to 1.70c for narrow. Cold-rolled is 2.25c to 2.35c.

Philadelphia — Some strip business has been booked at the new prices recently announced but the situation generally is dull and buying continues disappointing. Hot-rolled strip is 1.55c to 1.60c for wide and 1.65c to 1.70c, Pittsburgh, for narrow. Cold-rolled strip is 2.25c to 2.35c, Pittsburgh.

Youngstown, O.—The recent advance of $1 a ton in hot-rolled strip to 1.60c, Pittsburgh, has been put into effect by all makers in this district, and new business is coming in at a satisfactory rate. Cold-rollers support the advance of $2 a ton to the basis of 2.35c, Pittsburgh and Cleveland, and declare they are getting the new price without difficulty.

Cleveland—New hot-rolled strip prices at a $1 a ton advance over 1.55c and 1.65c, Pittsburgh, for wide and narrow, respectively, have not received test though there have been sales of cold-rolled strip at the new price of 2.35c, Cleveland and Pittsburgh, representing advance of $2 a ton. Sellers report no opposition to the new cold-rolled price.

Chicago — Hot-rolled strip mills are shipping more material for automotive frames for one group of cars. Miscellaneous manufacturing orders likewise have picked up in the last ten days. Narrow hot-rolled strip is quoted 1.75c to 1.80c, Chicago, while wider material is 1.65c to 1.70c. Despite the fact that little second quarter inquiry appears for cold-rolled strip, western mills are naming 2.35c, Pittsburgh-Cleveland, which represents an advance of $2.

Warehouse Sales Are Slow Manifesting Betterment

Warehouse Prices, Page 93

New York—Increase in quantity differentials, applying to bars, bands, blue annealed sheets, hoops, plates and structurals, effective March 11, is announced by Joseph T. Ryerson & Son Inc., leading warehouse sellers in this territory. Other warehouse interests are following the revised plan. Following differentials will apply only to the above products, although an order may cover one product or it may include a combination of several of those named: 400 pounds and under —50 cents extra over base; 401 pounds to 999 pounds—base, 1000 pounds to 3999 pounds—20 cents per 100 pounds less than base; 4000 pounds to 7999 pounds—40 cents per 100 pounds less than base; 8000 pounds to 1499 pounds—60 cents per 100 pounds less than base; 15,000 pounds and over. —75 cents per 100 pounds less than base.

Products not listed as included in the differential changes are priced as formerly. Such commodities when included in mixed orders will not be considered a part of the weight that determines the price reduction. Currently warehouse volume shows slight improvement, reflecting some gain in building activities. Recent improvement in cold-rolled products holds. Effect of the recent changes in increased differentials on a number of products has not been tested.

Baltimore—Warehouse prices are unchanged. Business is quiet. Sheets are moving slowly.

Philadelphia—Some jobbers report no gain in orders over the corresponding period in February, although in one case an increase of 10 per cent is reported. Prices are unchanged.

Buffalo—Prospect of an early opening of building construction leads warehouse sellers of iron and steel to predict increased sale of materials.

Pittsburgh — Sales continue to drag. Business so far this month has shown little improvement and for some sellers has declined slightly. Occasional sharp price concessions on bars and plates are noted.

Cleveland—Sheets, hot-rolled bars and smaller bar shapes are fairly active and moving in a gradually improved volume. Warehouses look for March business to show a slight increase over February, despite slackening earlier in the current month. Prices are unchanged and reasonably firm.

Detroit—Sales of iron and steel from stock are spotty. Prices are firm and unchanged.

Cincinnati—Improvement is noted in orders for shapes and bars. New quotations on No. 24 black sheets are 3.90c, and on No. 24 galvanized 4.40c.

St. Louis—Heavy weather has temporarily halted outdoor activities, and slowed down deliveries from warehouses. Purchasing by railroads is on a larger scale.

Iron Ore Prices Likely To Be Reaffirmed

Iron Ore Prices, Page 82

Cleveland—Prices of Lake Superior iron ore for 1931 have not been determined but opinion among producers is growing that 1930 quotations will be reaffirmed. None will admit a possibility of a reduction. The long-range trend of ore prices undoubtedly is upward but it is felt the present situation will not permit action this year. Sellers are preparing to quote on the Ford Motor Co.'s inquiry by April 1.

Lake Erie docks March 1 held nearly 500,000 tons more than on that date a year ago, as shown by the following statement of receipts and shipments for the past 12 months by the Lake Superior Iron Ore association:

	Receipts	Shipments	Dock balance March 1, 1931
Buffalo	2,898,965	172,811	3,598
Erie	1,063,813	1,128,767	66,943
Conneaut	7,651,381	7,431,853	1,853,077
Ashtabula	5,718,879	5,158,085	2,079,136
Fairport	1,923,509	1,858,267	422,560
Cleveland	7,374,894	4,964,177	1,062,671
Lorain	2,532,098	973,285	154,694
Huron	883,114	925,067	321,796
Toledo	1,733,191	980,966	28,899
Total	31,779,844	23,593,278	6,011,374
Total 1 year previous	45,772,572	33,877,519	5,535,835

Concrete Bars

(*Concluded from Page 75*)

Harvey, La., in connection with the Louisiana-Texas intracoastal waterway. Bids close April 7. Federal aid projects, highways and bridges, in southern states call for much reinforcing steel.

Contracts Placed

1750 tons, substructure Ford assembly plant, Seattle, to Pacific Coast Steel Corp., Seattle.

500 tons, sewer, Westchester county sanitary sewer commission, Yonkers, N. Y., to Igoe Bros., Newark, N. J.; La Rocca Construction Co., general contractor.

500 tons, Hudson river bridge paving, to McClintic-Marshall Corp., Bethlehem, Pa., through Corbetta Concrete Corp.

500 tons, decking for steel span Lake Union bridge, Seattle, to Pacific Sand & Gravel Co., Seattle.

480 tons, five barrack buildings, naval training station, Hampton Roads, Va., bureau of yards and docks, to Knoxville Iron Co., Knoxville, Tenn.; Worsham Bros., general contractors, Knoxville, Tenn.

275 tons, water purifying system, Chicopee, Mass.; to Joseph T. Ryerson & Son Inc., Chicago.

275 tons, Amarillo, Tex., to Sheffield Steel Corp., Kansas City, Mo.

200 tons, highway, Ocean parkway, Long Island, N. Y., through Johnson, Drake & Piper, general contractor, to Truscon Steel Co., Youngstown, O.

200 tons, substructure federal building, Seattle, to Soule Steel Co., Portland.

150 tons, memorial abbey, Cypress Hills cemetery, Brooklyn, N. Y., to Joseph T. Ryerson & Son Inc., Jersey City, N. J.

149 tons, West Third street approaches for foot and traffic bridges, to Concrete Steel Co., Pittsburgh, through Dawson and Finnan, Cleveland, general contractors.

145 tons, Massachusetts Institute of of Technology unit, Cambridge, Mass.; to Kalman Steel Co., Chicago.

100 tons, school auditorium, Sawtelle, Calif., to unstated company.

100 tons, telephone exchange building, Tacoma, Wash., to Pioneer Sand & Gravel Co., Seattle.

Contracts Pending

1000 tons, Queen's anchorage, Triboro bridge, New York; bids, department of plants and structures.

550 tons, Buttonwood street bridge, Reading, Pa.; John H. Wickersham, Lancaster, Pa., low on general contract.

325 tons, Market street subway, Philadelphia; Keystone Construction Co., Philadelphia, reported low.

328 tons, highways, Mississippi, including federal aid projects under several contracts; bids March 20.

200 tons, highway work, Imperial county, Calif.; bids received.

175 tons, covered concrete reservoir, board of water commissioners, Springfield, Mass.; bids April 14.

150 tons, highway, Middletown, N. J., county project; bids March 26.

130 tons, highway, Ocean City-Strathmere road, Cape May county, N. J.; bids April 1.

Fire Clay and Silica Refractories Are Reduced

Refractories Prices, Page 82

Pittsburgh—Leading producers of refractory brick have announced a reduction of $3 per 1000 pieces on first quality fire clay brick and silica brick, effective March 13. The market on these two grades becomes $40. These reductions follow price shading which has been noted occasionally for several months. Magnesite and chrome brick are unchanged at $65 and $45 respectively. Imported grain magnesite continues $40, seaboard, with domestic material $22, Chewelah, Wash. Ground fire clay and silica cement have been reduced 50 cents a ton to $6.50 and $8, respectively, in bulk. Business in refractory materials continues slow and little improvement is noted since the first of the year when stocks were increased slightly. Blast furnace relining is less active than a year ago and new steel plant construction involving refractory brick is quiet. Refractory demand for repair work reflects the current and recent quiet in iron and steelmaking operations but some improvement is looked for.

Pipe

Massachusetts to Build 10-Mile Steel Line—Prices on Cast Weak in East

PIPE PRICES, PAGE 93

Chicago—Chicago board of public works opened bids early in the week for another cast pressure pipe order, which will comprise about 1500 tons of 6, 8 and 12-inch. Chicago has awarded 11,000 tons of the 16,000-ton inquiry of 30, 36 and 48-inch cast pipe to two domestic producers, rejecting the French bid. Recent orders for attractive municipal work, including the Chicago business, discloses weakness of $2 to $3 a ton in Chicago delivered prices.

Boston—Bids will be taken March 27 for construction of the Coldbrook-Swift tunnel in western Massachusetts by the Metropolitan district water supply commission. Frank E. Winsor, chief engineer, 11,000 feet of steel pipe being required for grouting and other work in the 10-mile tunnel. Plans call for 100 tons of reinforcing steel and 138 tons of cast iron pipe, wrought iron and miscellaneous steel. about 750 tons of various sizes of pipe were placed in the past week, while 8000 feet of 6, 8 and 12-inch pipe, Greenfield, Mass., will be awarded soon.

New York—Cast iron pipe prices are weak. Under $34, eastern foundry, is noted on several current contracts. Lettings are active, especially for municipal work in and about New York City. Two contractors' lettings, 1800 tons, 1000 tons for Elizabeth, N. J., and 500 tons for Westchester county, are included among awards. Bids close March 18 on 4835 tons, 8 and 12-inch, yard stocks, Brooklyn, in addition to more than 1000 tons of fittings.

Standard Oil of New Jersey has withdrawn its inquiry for approximately 2500 tons of steel pipe. Memphis Utilities Co. is expected to inquire in a month for 250 miles of line pipe.

Pittsburgh—Pipe demand is slow to improve. The line pipe market is quiet with closing on pending work deferred. Merchant pipe demand remains dull, although better activity in building construction points to an increase in buttweld pipe business. Mill operations hold at 35 per cent.

Cast Pipe Placed

11,000 tons, 30, 36 and 48-inch, for Chicago, to James B. Clow & Sons, Chicago, and United States Pipe & Foundry Co., Birmingham, Ala., at $40.65 to $42, delivered.

3500 tons, up to 12-inch, mostly for gas line installation in Middle West, Allied Power & Light Co., to American Cast Iron Pipe Co., Birmingham, Ala., and United States Pipe & Foundry Co., Birmingham, Ala.

1500 tons, Beatrice, Nebr., to United States Pipe & Foundry Co., Birmingham, Ala.

1200 tons, 20-inch, for Queens, N. Y., to Warren Foundry & Pipe Co., Phillipsburg, N. J.; contractor's letting.

1100 tons, Brocton, Mass., to American Cast Iron Pipe Co., Birmingham, Ala.

1100 tons, Akron, O., to American Cast Iron Pipe Co., Birmingham, Ala.

1000 tons, 30-inch, for Elizabeth, N. J., to Warren Foundry & Pipe Co., Phillipsburg, N. J.; John Dominguez, Hasbrouck Heights, N. J., general contractor.

670 tons, St. Louis, to American Cast Iron Pipe Co., Birmingham, Ala.

619 tons, Denver, to American Cast Iron Pipe Co., Birmingham, Ala.

600 tons, Dupo, Ill., to U. S. Pipe & Foundry Co., Birmingham, Ala.

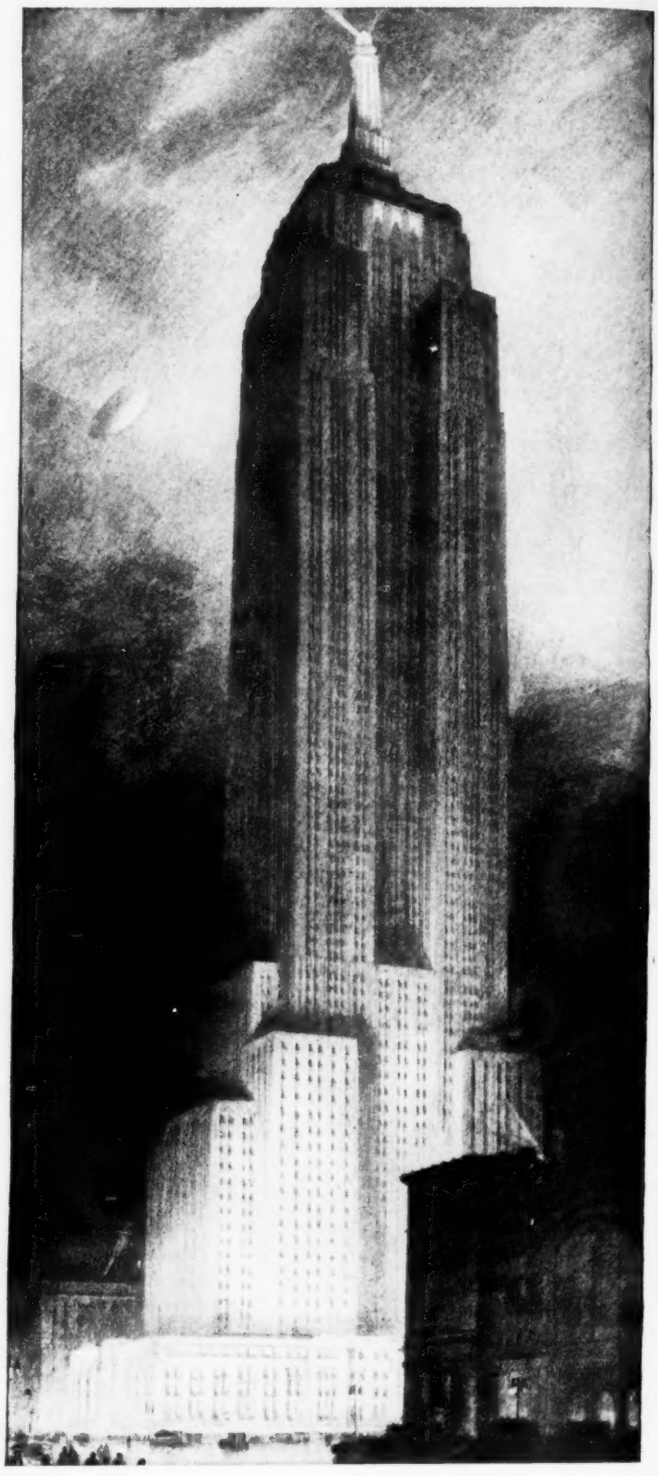
600 tons, 16-inch for Brooklyn, N. Y., to Donaldson Iron Works, Emaus, Pa.

600 tons, various sizes, for Maybrook, N. Y., to Central Foundry Co.; valves, Eddy Valve Co., Waterford, N. Y., hydrants and boxes, Ludlow Valve Mfg. Co.

533 tons, Springfield, Mass., 4 to 12-inch, to United States Pipe & Foundry Co., Burlington, N. J.

STEEL SHEETS

Are serving an important and ever growing list of uses in the fields of good construction. The EMPIRE STATE BUILDING—the world's tallest structure—is a modern triumph of steel and concrete. It will house some 40,000 people, a veritable city in the air, and rises a sheer 1250 feet above the pavement. The tip of the mooring mast for dirigibles constructed atop the 85-story central tower, surpasses by 221 feet the height of the world famous Eiffel Tower.



AMERICAN APOLLO Best Bloom Galvanized Sheets

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were used, in probably the largest quantities ever specified for this purpose in a single building, in the extensive ventilating systems of

The EMPIRE STATE BUILDING

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CYCLONE FENCE COMPANY
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ILLINOIS STEEL COMPANY
MINNESOTA STEEL COMPANY
NATIONAL TUBE COMPANY
OIL WELL SUPPLY COMPANY
THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & RAILROAD CO.
UNIVERSAL ATLAS CEMENT COMPANY

Pacific Coast Distributors—Columbia Steel Company, Russ Building, San Francisco, Calif. *Export Distributors*—United States Steel Products Company, 30 Church Street, New York, N. Y.

515 tons, 24-inch, Class B, Vallejo, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.
500 tons, 12 and 16-inch monocast, for Yakima, Wash., to American Cast Iron Pipe Co., Birmingham, Ala., through R. C. Polk, Seattle.
500 tons, 16 to 24-inch, Westchester county, sanitary sewer commission, mostly for New Rochelle, N. Y., to Donaldson Iron Works, Emaus, Pa.
120 tons, Bedford, Mass., 6-inch, to Donaldson Iron Co., Emaus, Pa.
100 tons, Wilmington, Mass., 10-inch, to Warren Foundry & Pipe Co., Phillipsburg, N. J.
100 tons, small sizes cast iron, for Yakima, Wash., to McWane Cast Iron Pipe Co., Birmingham, Ala.
400 tons, Hastings, Nebr., to American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

11,486 feet, 12-inch; 5285 feet, 8-inch; 2308 feet, 4-inch; and 23,400 feet, 6-inch; also 71 hydrants, for Fox Point, Wis. C. S. Whitney, Milwaukee, city engineer; bids taken after March 21.
8000 feet, Greenfield, Mass., 6, 8 and 12-inch, bids to close week of March 16.
6000 tons Class C for Milwaukee; bids March 24. Includes 96 tons 20-inch plain; 443 tons 24-inch plain; 52 tons 36-inch plain; 2986 tons 48-inch plain; 2089 tons 54-inch plain; 5 tons 24-inch lugged; 33 tons 36-inch lugged; 89 tons 48-inch lugged; 21 tons 54-inch lugged; 119 tons 24, 30, 36, 48 and 54-inch special castings.
1500 tons, estimated, 30, 36 and 48-inch for Washington; bids March 23; part or all of 2450 feet, 48-inch, may go concrete or cast iron pipe.
1500 tons, estimated, comprising 1000 feet of 6-inch, 7000 feet of 8-inch, and 3000 feet of 12-inch for Chicago board of public works; bids March 16.
900 tons, 6 and 8-inch, board of water commissioners, Greenlawn, L. I.; bids in.
700 feet, cast iron or steel, 48-inch, connection, Little Falls pumping station, to Wannaque aqueduct, Passaic Valley water commission, Paterson, N. J., bids March 24. Requirements also include 30, 36 and 48-inch gate valves and 30-inch pressure regulating valves.
250 tons 4 to 14-inch, for Rhinelander, Wis.; bids close March 23. Mrs. Mabel P. Carr, city clerk.
150 tons, cast pipe and gates, various sizes, concrete covered reservoir connections, Springfield, Mass.; bids April 14.
136 tons, 4 to 10-inch, class 150, National Guard training camp, San Luis Obispo, Calif.; bids March 25.
Unstated tonnage, Oakfield, Fond du Lac county, Wis., $40,000 bond issue recently carried for construction of waterworks system. Plans by McMahon Engineering Co., Menasha, Wis., pipe to be mostly 6 and 8-inch; also elevated steel tank of 60,000 gallons and reservoir of 75,000 gallons.

Steel Pipe Pending

2200 tons, steel pipe, ¾-inch to 8-inch, sprinkler system, wharves and sheds, New Orleans waterfront, also 120,000 sprinklers; Grinnell Co., Providence, R. I., general contractor.
11,000 lineal feet, large size steel pipe for grouting, etc., metropolitan water supply commission, 20 Somerset street, Boston; Frank E. Winsor, chief engineer.

Wire

Advance of $2 Made General by All Wire Producers — Users Take Little Future Interest

WIRE PRICES, PAGE 71

New York—Independent producers are beginning to follow the lead of the principal seller in advancing prices $2 a ton on all wire products, except fencing and bale ties, for second quarter. Meanwhile, the market on plain wire is 2.20c, Pittsburgh; wire nails $1.90 to $2, with shading of $1 a ton to jobbers; and $35 for wire rods.

Pittsburgh — Independent wire producers have issued new price lists calling for a horizontal advance of $2 a ton on second quarter tonnage of all wire products except fencing and bale ties, following the lead of the American Steel & Wire Co. in this respect. The new prices as yet have had no opportunity to undergo a test. This raises wire nails to $2 to jobbers and $2.10 to the merchant trade while plain wire is advanced to 2.30c and wire rods to $37. Consumer interest in new contracts is light. Specifications continue heavier than a month ago with the price advance held responsible for the placing of some tonnage against con-

Cleveland—Other sellers of wire and wire products, aside from a leading interest which named $2 a ton higher prices last week, have fallen in line with a similar advance. There is little current tonnage not under contract at prices prevailing before the announcement and consuming interests consequently do not afford a test. The trade looks for a true test about April 1 when first quarter contracts have expired. For the buyer not under contract to enter the market today the going figure is $2 to $2.10 a keg for nails; 2.30c for plain wire; 3.30c for spring wire and $37 a ton for wire rods. Releases over the past week have been in good volume, with especial improvement reported in wire rods.

Chicago—Independent wire products makers have followed with a $2 a ton advance in all wire products except annealed fencing and bale ties. Practically no second quarter tonnage has been booked but a few inquiries have appeared. Specifications for manufacturers' wire have exceeded common wire orders lately.

Nut, Bolt, Rivet Needs Are Increasing Slightly

Bolts, Nuts, Rivets Prices, Page 71

Pittsburgh — Specifications for bolts, nuts and rivets, although still light, show a slight improvement recently over activity of a month ago. Stocks of practically all consumers are low but orders represent only early needs. Second quarter contracting is fairly active with little resistance to prices of 73 off for bolts and nuts and 2.75c, Pittsburgh, for large rivets.

Cleveland—With chief support from the automotive industry, bolt and nut production is considerably higher than last month. Expanding activity is more noticeable in increased specifications for manufacturers wire and commitments for wire rods. Price remains unchanged at 73 off list for bolts and nuts and 2.75c, Cleveland and Pittsburgh, on rivets.

Chicago—About half the regular contract buyers of bolts, nuts and rivets have closed for second quarter.

Producers operations at 45 per cent, have gained about 5 points, while specifications remain at about the January-February rate. Discounts of 73 off for nuts and bolts are unchanged. Producers report a fairly firm price structure. Implement buying is light.

Ferroalloy Shipments Steady, in Small Lots

Ferroalloy Prices, Page 82

New York—Spiegeleisen is moving at a rate comparable with steelmaking operations. Domestic material, 19 to 21 per cent, is unchanged at $30, furnace, in carload lots. Ferromanganese is featureless at $85, duty paid, in carloads.

Some sellers report more interest in tungsten ores. Prices are nominal with futures about $11.25, a short ton unit, duty paid, and fu-ures a little higher but indefinite. Alloys such as chrome, vanadium and silicon are moving in fair amounts.

Pittsburgh—Ferroalloy specifications continues fairly steady. Shipeisen are slightly heavier than a month ago but continues in small ments of ferromanganese and spiegellots.

Prices are $89.79, delivered, for ferromanganese and $30, furnace, for spiegeleisen.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago furnace	$17.50
Pittsburgh, dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley furnace	17.00
Cleveland fur., local del.	17.00
Philadelphia, delivered	17.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	19.91 to 20.91
Buff., all-rail Newark	18.28 to 18.78
Ala., Bir. fur., local del.	12.00 to 13.00
Alabama, del. Chicago	17.01
Alabama, del. St. Louis	14.92 to 15.42
Alabama, del. Cincinnati	14.69 to 15.19
Ala., Phila., dock del.	15.75 to 16.25
Ala., Balt., dock del.	15.50 to 16.00
Ala., Balt., dock del.	15.50 to 16.00
Alabama, New York dock	16.00 to 16.50
Ala., Boston dock del.	16.25 to 16.75
Tenn., Bir. base, local del	13.00
Tennessee, del. Cinn.	14.69 to 15.19
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	18.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	18.76 to 19.26

MALLEABLE

Valley furnace	17.00
Cleveland fur., local del.	17.00
Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Chicago, furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Eastern Penn., del.	17.25 to 17.75
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley, furnace	17.00

BESSEMER

Valley furnace	17.00
Pittsburgh, delivered	18.13 to 18.63
Pittsburgh, furnace	17.50

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 27.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$26; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.50
Connellsville foundry	3.25 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.50
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	10.00
North African low phosphorus	9.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$11.25 to $11.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
South African, 52%	26 to 28 cents
South African, 49-51%	25 to 26 cents
South African, 44-47%	24 cents
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	23 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$40.00
Georgia, Alabama	40.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	40.00
Joliet, Ill., East Chicago, Ind.	49.00
Birmingham, Ala.	50.00 to 51.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	35.30 to 36.30
Chicago	31.00
Forging, Chicago	36.00
Forging, Pittsburgh	36.00
Forging, Philadelphia	40.30 to 41.30

SHEET BARS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00
Chicago	31.00

SLABS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	30.00
Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	160.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

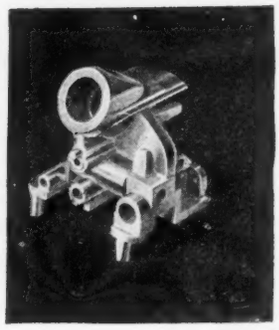
†Carloads. Differentials apply to large quantities.

*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

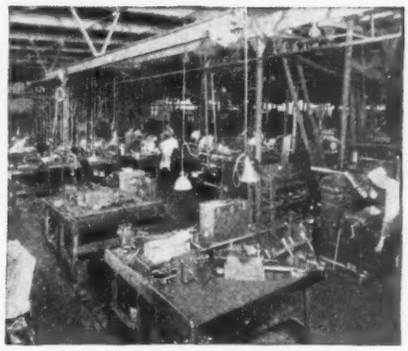
Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$14.00
Washed gravel, import duty paid east, tide, gross ton	19.00 to 19.50

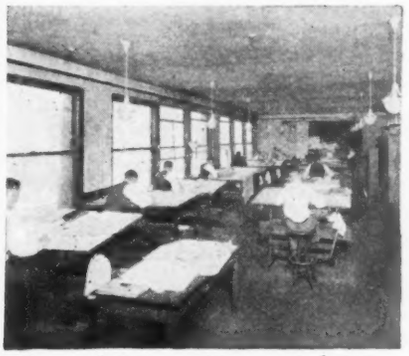


What lies behind A REPUTATION



A corner of the production department in the Stewart plant.

Vacuum cleaner housing die-cast in two halves.



Stewart draftsmen applying new products to the die-casting process.

For Expert Die Casting

A record or service—years of experience—modern methods—an organization of experts.

. . . That is the reason why "STEWART" stands for fine die-castings in America today.

Die-casting, as a process, has developed with amazing rapidity during the past twenty years. And Stewart has kept modern. As a result Stewart has introduced new economy as well as simplified production to a long list of successful manufacturers. Each casting that leaves the Stewart plant is smoothly finished, strong, accurate and represents real savings in reduced machining, polishing and assembling costs.

Call in a Stewart engineer for practical information and advice about the die-casting process and its relation to your product. A card will bring our new Engineer's Die-Casting Handbook. Or why not send blue prints or samples for quotations today.

Our new "Engineer's Die Casting Handbook" is now ready. It contains a brief, factual description of the die casting process in all its modern developments. Write for your copy today.

Stewart

THE STEWART DIE-CASTING CORP.

4541 Fullerton Avenue, Chicago, Ill.

DETROIT NEWARK PITTSBURGH DAYTON CLEVELAND ST. LOUIS

Pig Iron

Sales for Second Quarter Still Light—Southern Iron Up 50 Cents—Cleveland Price Down

PIG IRON PRICES, PAGE 82

Pittsburgh—Demand for pig iron shows only a slight improvement since a month ago. Foundry operations are spotty, slow to expand, and generally unchanged. Inquiry is lacking for all grades, with orders limited to small, spot lots. Merchant iron output remains at a low level, although the Shenango Furnace Co. is expected to put in one or two idle stacks at Sharpsville, Pa., shortly. Producers now are usually quoting $17, valley, for No. 2 foundry, bessemer and malleable, with the Pittsburgh furnace base 50 cents above this level. Basic is nominal, no sales being noted in this district.

Boston—Alabama furnaces have raised their price 50 cents to $11, base, for delivery in this district.

New York—The volume of pig iron sales is maintained at approximately 6000 tons weekly. Buffalo iron is stronger, most sellers now quoting $15.50, base, furnace, as minimum. Prices are untested, however, with new inquiry light. The Worthington Pump & Machinery Corp. has closed on 325 tons of No. 1X foundry iron, the order reported going to an eastern producer at $16, furnace. Barge shipments from Buffalo will begin earlier this year than usual, the New York state canal scheduled to be opened April 6. Though leading sellers of southern iron have announced an advance of 50 cents a ton on No. 2 plain now asking $11, furnace, on shipments outside the district, the market may still be quoted $10.50, furnace, or $16, delivered, New York docks.

Philadelphia—The announced intention of Birmingham, Ala., furnaces to quote $11, base, furnace, as a minimum is the only bullish aspect of a generally weak and untested market. Following the sale of 6000 to 9000 tons to a Delaware river pipemaker a month ago, part of which was southern iron, only carload lots have been sold. No. 2 plain is easy at $17.76, Philadelphia.

Buffalo—Larger inquiry for pig iron is expected during the latter half of the month. Only small sales were made during the past week.

Youngstown, O. — Recent sales include 100 tons of standard bessemer iron which brought $17, valley, and several carloads of basic, also at $17, valley. In fact, bessemer, malleable, No. 2 foundry and basic bring $17, valley furnace, as all former price differentials between these grades have been wiped out temporarily. No. 3 foundry and gray forge still maintain their 50-cent differential, bringing $16.50, valley.

When the Shenango Furnace Co. relights its stack at Sharpsville, Pa., as planned shortly, there will be 12 stacks blowing in this district out of a total of 34.

Cleveland—Foundry and malleable iron has been reduced 50 cents to $17, base, furnace, for delivery in the local 50-cent switching area. Prices named for some time by lake furnaces for delivery into competitive districts have ranged from $16 to $17, base, furnace. These are unchanged. Alabama furnaces have been offering iron here at $10.50, base, equivalent to $16.51, delivered, though some have advanced to $11 furnace. Not much buying has ensued, the local market continuing quiet. Sales booked by all lake furnaces with headquarters in Cleveland amounted to 10,000 tons in the past week.

Cincinnati — Southern furnaces have advanced quotations 50 cents to $11, base, Birmingham. Pig iron sales in this district during the past week fell below 2000 tons. A Michigan melter is inquiring for 500 to 1000 tons of malleable iron.

Chicago—Sales have picked up slightly due to additional contracting for second quarter. Buyers of foundry and malleable iron are pressing for lower prices but $17.50, furnace, is steady for the base grades, except for minor resales from local stocks. Four of six merchant stacks in this district are operating. Alabama furnaces have raised their price to $11, base, for delivery in this district.

Silveries are more active, about 300 tons being sold this week, and 200 tons pending.

St. Louis—Inquiry for second quarter is slow and sales in this district in the past week totaled only 2000 tons. The melt continues on the improved basis noted several weeks ago. Alabama is up 50 cents to $15.42, delivered, St. Louis.

Birmingham, Ala.—The market is a little more active, with sales in eastern territory, especially Philadelphia. Production has been increased by blowing in No. 1 stack of the Republic Steel Corp.

Toronto, Ont.—Pig iron sales for the week, 1200 tons, again showed a slight gain. Melters indicate more interest in the second quarter.

Operations Continue Gains at Cleveland and Chicago

Youngstown, O.—Ingot operations in the Mahoning valley advanced one point this week to 51 per cent of capacity. The current week is the first in 1931 passing the 50 per cent mark. Of chief importance is the fairly continuous gain in sheet production. Niles, O. plants show 31 sheet mills under power, against 29 last week. Mahoning Valley Steel Co.'s small sheet plant is at capacity, compared with 75 per cent last week while operations at Empire Steel Corp.'s Falcon plant are slightly higher. At Sharon, Pa., the Shenango Furnace Co. has blown in a blast furnace after three months idleness. The larger steel companies report unchanged operations with Sheet & Tube plants again at 40 per cent, Republic Steel at 58 Newton at 70, and Carnegie at 50.

Philadelphia—Eastern ingot operations are at 51 per cent, down two points from last week. A leading mill is running at 54 per cent.

Buffalo—Operations show another three-point drop this week to 51 per cent. Indications point to a continuance of this rate.

Pittsburgh—Operating schedules are steady. Ingot production continues unchanged at 50 per cent with the number of active steelworks blast furnaces also unchanged at 21 of 54. Sheet and tin plate schedules are unchanged at 45 and 75 respectively. Strip output continues 55 with pipe holding around 35 per cent.

Cleveland — Open-hearth operations have taken the fourth material weekly gain and this week are up to 70 per cent capacity with the addition of two more furnaces, making 24 active of the 34 in the district. An independent and one of the Corporation's subsidiaries locally both run now at 100 per cent of ingot capacity. This 70 per cent level is a gain of five points over last week and of 17 points over four weeks ago.

Chicago—Both blast furnace and open hearth operating capacity has been increased, and the ingot rate for the district is up two to three points to about 60 per cent. A steelworks blast furnace at Gary, which has been banked for over two months, has been relighted, making 16 of the 36 blast furnaces active. Sheet mills have made outstanding gains, and now are at 70 per cent.

Birmingham, Ala.—Sixteen open hearth furnaces are producing. Estimate of the district is 65 per cent.

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Scrap

Melters Resist Prices Which Yield Gradually—Buying Confined to Small Prompt Lots

Chicago—Steel scrap consuming and selling interests are deadlocked on prices. Bookings are negligible. Continued pressure against prices from buyers is resisted strongly by dealers, whose views are that market levels are below actual costs of collection and preparation. Chief activity is in heavy melting steel, but this is entirely in dealer trading. Speculative activity largely has disappeared. Few selling interests are bearish in view of recent increasing steelworks operations. Several open hearth grades have sagged, particularly rolled steel car wheels and hydraulic compressed sheets, on the basis of recent small bookings. No test has been given recently on railroad scrap. Material sold on the Rock Island list last week went

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	9.50 to 11.00
Boston, dealers	6.75 to 7.00
Buffalo, No. 1	11.00 to 11.50
Buffalo, No. 2	9.50 to 9.75
Chicago	9.75 to 10.25
Cinci., deal.	9.50 to 10.00
Cleve., No. 1	10.00 to 10.50
Cleve., No. 2	9.75 to 10.00
Det., No. 1 deal.	9.00 to 9.25
Det., No. 2 deal.	7.00 to 7.50
E. Pa. del. mill	10.00 to 11.00
N. Y. del. R. R.	7.00
N. Y. deal. No. 2	5.50
N. Y., deal. yd.	5.00
Pitts., No. 1	12.50 to 13.00
St. L. No. 1 sel.	10.50 to 11.00
Federal, Ill.	9.00 to 9.50
Granite C., Ill.	8.50 to 9.00
Valleys, No. 1	12.00 to 12.50

COMPRESSED SHEETS

Buffalo, dealers	9.50 to 9.75
Chicago	8.25 to 8.75
Cleveland	9.00 to 9.25
Detroit, dealers	9.00 to 9.50
E. Pa. new mat.	9.00 to 10.00
Pittsburgh	12.50 to 13.00
Valleys	12.00

BUNDLED SHEETS

Buffalo	7.00 to 7.50
Cinci., deal.	8.75 to 9.25
Cleveland	7.00 to 7.25
Eastern Pa.	9.00
Pittsburgh	11.00 to 11.50
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	5.00 to 5.50
Cincinnati	5.00 to 5.50
Detroit, dealers	6.00 to 6.50
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	12.00 to 12.50
Boston, dealers	5.50 to 7.00
Buffalo	13.75 to 14.25
Chicago (3 ft.)	11.00 to 11.50
Chicago (2 ft.)	12.00 to 12.50
Cinci., deal.	14.25 to 14.75
Detroit, deal.	12.50 to 13.00
Pitts. (open-hearth, 3 ft. and less)	14.50 to 15.00
St. Louis	13.00 to 13.50

STOVE PLATE

Birmingham	8.00 to 8.50
Boston, con.	8.00 to 8.50
Buffalo	9.50 to 10.00
Chicago, net	7.75 to 8.25
Cinci., deal. net	5.25 to 5.75
Det., net, deal.	6.25 to 6.75
Eastern Pa.	9.00 to 9.50
N. Y., deal. mill	4.75
St. Louis	8.00 to 8.50

COUPLERS, SPRING

Buffalo	13.50 to 14.00
Chicago	12.00 to 12.50
Eastern Pa.	16.50
Pittsburgh	16.00 to 16.50
St. Louis	10.50 to 11.00

ANGLE BARS—STEEL

Chicago	11.00 to 11.50
St. Louis	9.50 to 10.00

LOW PHOSPHORUS

Buff., billets and bloom crops	15.00 to 15.50
Cleveland bil. and bloom crops	16.50 to 17.00
Eastern Pa.	17.00
Pittsburgh billet bloom crops	17.50 to 18.50
Pitts. sheet bar crops	16.50 to 17.00

FROGS, SWITCHES

Chicago	10.50 to 11.00
St. Louis	10.00 to 10.50

SHOVELING STEEL

Chicago	9.75 to 10.25
Cleveland	7.00 to 7.50
St. Louis	9.00 to 9.50

RAILROAD WROUGHT

Birmingham	9.00 to 9.50
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	8.50 to 9.00
Buffalo, No. 2	11.00 to 11.50
Chicago, No. 1	9.00 to 9.50
Chicago, No. 2	9.75 to 10.25
Cinci., No. 2	9.50 to 10.00
Eastern Pa.	11.00
N. Y., No. 1 deal.	10.00 to 10.50
Pitts., No. 2	12.50 to 13.00
St. Louis, No. 1	7.50 to 8.00
St. Louis, No. 2	9.00 to 9.50

SPECIFICATION PIPE

Boston	6.50 to 7.00
Eastern Pa.	11.50 to 12.00
N. Y., deal.	7.25 to 7.50

BUSHELING

Buffalo, No. 1	9.50 to 9.75
Chicago, No. 1	8.00 to 8.50
Cinn., No. 1 dl.	8.00 to 8.50
Cinn., No. 2	4.50 to 5.00
Cleve., No. 2	7.00 to 7.50
Det., No. 1 new deal.	8.00 to 8.50
St. L., No. 1	6.50 to 7.00
Val. new No. 1	11.00 to 11.50

MACHINE TURNINGS

Birmingham	7.00 to 7.50
Boston, dealers	2.00 to 2.50
Buffalo	6.00 to 6.50
Chicago	4.25 to 4.75
Cinn., deal.	4.50 to 5.00
Cleveland	4.75 to 5.25
Detroit	4.00 to 4.50
Eastern Pa.	7.00 to 7.50
N. Y., deal.	3.00
Pittsburgh	7.75 to 8.00
St. Louis	4.00 to 4.50
Valleys	8.50 to 8.75

BORINGS AND TURNINGS For Blast Furnace Use

Boston	2.00 to 2.60
Buffalo	6.75 to 7.25
Cinn., deal.	4.50 to 5.00
Cleveland	7.00 to 7.50
Detroit, deal.	4.75 to 5.25
Eastern Pa.	6.00 to 7.00
N. Y., deal.	3.00
Pittsburgh	7.50 to 8.00

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	7.00 to 7.50
Boston, chem.	9.10 to 9.60
Boston, deal.	2.00 to 2.50
Buffalo	6.75 to 7.25
Chicago	4.50 to 5.00
Cinn., deal	4.50 to 5.00
Cleveland	7.00 to 7.50
Detroit, deal.	4.75 to 5.25
Eastern Pa.	7.00 to 7.50
E. Pa., chem.	13.50 to 14.50
N. Y., deal.	3.50
Pittsburgh	7.50 to 8.00
St. Louis	6.00 to 6.50

PIPE AND FLUES

Cinn., deal.	7.50 to 8.00

RAILROAD GRATE BARS

Buffalo	7.25 to 7.75
Chicago, net	7.00 to 7.50
Cincinnati	7.00 to 7.50
Eastern Pa.	9.00 to 9.50
N. Y., deal.	6.00
St. Louis	7.50 to 8.00

FORGE FLASHINGS

Boston, deal.	5.50 to 6.10
Buffalo	9.00 to 9.50
Cleve. ov. 10 in.	8.00 to 8.50
Detroit	7.75 to 8.25

FORGE SCRAP

Boston, del.	5.10 to 5.60
Chicago	12.50 to 13.00
Eastern Pa.	10.50 to 11.00

ARCH BARS, TRANSOMS

Chicago, net	10.50 to 11.00
St. Louis	11.50 to 12.00

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	9.50 to 10.00
Chi., steelworks	7.50 to 8.00
Cleveland	8.00 to 8.50
Eastern Pa.	11.00
Pittsburgh	11.50 to 12.00
St. Louis	7.50 to 8.00

STEEL CAR AXLES

Birmingham	14.00 to 14.50
Boston, ship. pt.	14.00 to 15.00
Buffalo	15.50 to 16.00
Chicago	14.00 to 14.55
Eastern Pa.	18.50 to 19.50
St. Louis	14.50 to 15.00

SHAFTING

Bos., ship. pt.	13.00 to 13.50
Chicago	12.90 to 13.45
N. Y., deal.	13.00 to 14.00
St. Louis	12.00 to 12.50
E. Penna.	18.00

CAR WHEELS

Birming., iron	10.00 to 10.50
Boston, iron	14.00 to 14.50
Buffalo, iron	12.00 to 12.50
Buffalo, steel	13.50 to 14.00
Chicago, iron	10.50 to 11.00
Chi., roll steel	13.00 to 13.50
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	15.50 to 16.00
E. Pa. iron	13.50 to 14.00
Pitts., iron	13.50 to 14.00
Pitts., steel	16.00 to 16.50
St. Louis, iron	10.00 to 10.50
St. Louis, steel	12.50 to 13.00

NO. 1 CAST SCRAP

Birmingham	10.50 to 11.00
Buffalo (mach.)	11.00 to 11.50
Boston, textile	9.00 to 9.50
Chicago, mach.	10.65 to 11.20
Chi., railroad	10.10 to 10.65
Chicago, agri.	9.50 to 10.10
Cinn., mach. cup., gross	13.00 to 13.50
Cleve. cupola	12.00 to 12.50
Det., net deal.	8.50 to 9.00
E. Pa. cupola	13.00
N. Y. cup. deal.	8.00 to 8.50
N. Y., del. local foundries	12.00
Pitts., cupola	12.50 to 13.00
San Fran., del.	13.50 to 14.00
Seattle	8.50 to 9.00
St. L. No. 1 ma.	9.75 to 10.25
St. L. No. 1	9.00 to 9.50

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast.	11.50 to 12.50
Buffalo, break	8.00 to 8.50
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	6.50 to 7.00
Eastern Pa.	11.00
N. Y. No. 1 dl.	8.00 to 8.50
N. Y. break. dl.	7.00 to 7.50
Pittsburgh	9.50 to 10.00

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	12.00 to 12.50
Chicago, agri.	10.50 to 11.00
Chicago, R. R.	12.00 to 12.50
Cinn., R. R. dl.	11.50 to 12.00
Cinn., agri., dl.	12.00 to 12.50
Cleve., rail	12.00 to 12.50
Det. auto deal.	11.00 to 11.50
St. Louis, rail	10.00 to 10.50

RAILS FOR ROLLING 5 feet and over

Birmingham	10.75 to 11.25
Boston	8.50 to 9.00
Buffalo	11.00 to 11.50
Chicago	12.00 to 12.50
Eastern Pa.	13.00 to 13.50
New York	9.00 to 9.50
St. Louis	10.75 to 11.25

LOCOMOTIVE TIRES

Chicago, cut	13.00 to 13.50
St. L. No. 1	11.00 to 11.50

LOW PHOS. PUNCHINGS

Chicago	11.25 to 11.75
Buffalo	14.00 to 14.50
Eastern Pa.	15.50 to 16.50
Pittsburgh	15.50 to 16.00

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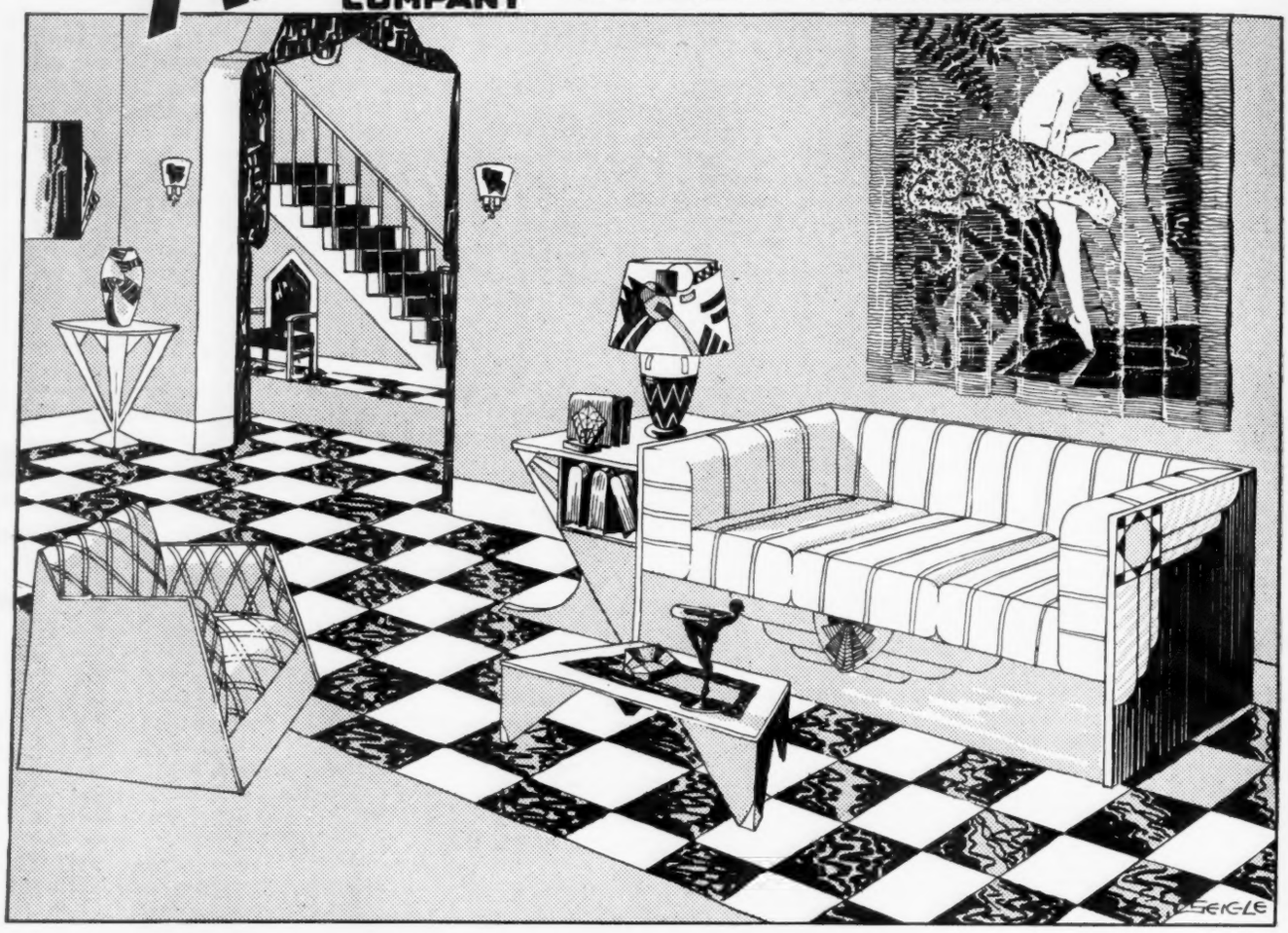

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NEW YORK.....1372 Hudson Term. Bldg.
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largely to Peoria and other downstate points.

Boston—Scrap prices are unchanged. About the only material moving is some skeleton scrap that went to a Worcester consumer and this brought $6.10 on cars here.

New York—Scrap buying is light. Eastern melters are buying close to requirements and in most cases are not adding materially to stocks. Shipments are generally limited to a few cars at a time. Several eastern Pennsylvania mills are reported to have bought some scrap, although the movement was not heavy. Dealers' buying prices are unchanged with heavy melting steel nominally quoted 10.50 eastern Pennsylvania, delivered.

Buffalo—Dealers are asking slightly higher prices for some grades of scrap than the trade is willing to pay, with the result that recent inquiries still are pending. Small sales are being made but tonnage business is lacking. The nominal price list is being revised to a considerable extent in anticipation of early covering of several inquiries.

Philadelphia—Steel and iron scrap continue dull with several leading consumers holding up shipments on contracts. Prices are unchanged and untested.

Pittsburgh—Steel and iron scrap are slightly easier as a result of lack of consumer interest. No new buying of heavy melting steel is noted but the ordinary grade is available at $13, which represents the top of the market. Compressed sheets are quotable at the same level. Sales of other grades are limited to small lots at unchanged prices.

Cleveland—Iron and steel scrap activity continues restricted. Blast furnace borings and turnings and No. 2 busheling are moving in fair volume to a local steelworks consumer for several weeks. Heavy melting steel remains inactive except for fair movement to the Warren, O., consumer. No. 1 is held nominally at $10 to $10.50 and No. 2 at $9.75 to $10.

A Cleveland steelworks that expected to take steel beginning March 15 has as yet made no releases and is not expected to for at least two weeks. It is understood the largest independent steelmaker in this district is receiving less scrap from its railroad source than its present consumption. Its reserve stocks, however, are heavy and no purchases in the open market are anticipated from this interest for some time. Foundry consumption of scrap is still light.

Cincinnati — Quotations on iron and steel scrap remain unchanged, with recent bids on railroad lists providing a certain test of the market. Prices paid for this material were about the same as a month ago, according to reports here. Shipments on orders continue fair, with little new business developing.

St. Louis—Purchases of steel and iron scrap continue moderate and almost exclusively for prompt delivery. Inquiry for second quarter requirements is negligible and brokers are not pressing sales for that delivery.

Opinion persists among dealers that prices are below the intrinsic value of practically all items of scrap and those with cash resources are more disposed to purchase for accumulation than to sell the market short.

Birmingham, Ala.—While quotations remain low and demand light, no inclination is shown by dealers to get business on concessions. Heavy melting steel is moving probably better than other items but $11 remains the maximum price.

Toronto, Ont.—The iron and steel scrap market is quieter. Current demand runs largely to machinery cast and sales on this account are increasing steadily. Demand for steel scrap, both in the Toronto and Montreal markets is featureless. Dealers are picking up odd lots of machinery cast and malleable scrap, but otherwise are out of the market. Prices are unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Tin Plate Specifications Increase Moderately

Tin Plate Prices, Page 71

Pittsburgh—Activity in tin plate is well sustained with a slight gain noted in recent specifications in some directions. Mill operations generally are unchanged, the average close to 75 per cent. Further improvement in demand and in production is looked for shortly in anticipation of the active spring period. Tin plate continues $5, Pittsburgh, per base box.

Coke

Beehive Foundry Grades Are Firmer—By-Product Prices Unchanged—Market Is Quiet

COKE PRICES, PAGE 82

Pittsburgh—Beehive coke demand is holding at about the February rate. Foundry requirements are steady, with a slightly firmer tone noted in prices. Furnace coke continues dull, in spot buying and contracting. The market usually is $2.50, except in case of distress lots. Heating coke is nearly out of season.

Boston—Coke prices will not be changed for second quarter, according to announcement. Foundry fuel continues to move slowly, while domestic grades are active.

New York—Shipments of beehive coke into this district continue light, with prices easy. The furnace grade is $2.50 to $2.65, Connellsville. Standard grades of foundry coke are $3.50 to $3.75, Connellsville, and premium brands $4.70 to $4.85, Latrobe, Pa. By-product coke is $9 to $9.40, Newark, N. J.; $11, New England; and $9, Philadelphia.

Cincinnati—Specifications for by-product foundry coke are down slightly, but oven interests interpret this as temporary. Quotations are unchanged.

St. Louis—Shipments of metallurgical coke are gaining moderately, and specifications for the remainder of March indicate the movement this month will be the heaviest since last fall. Prices are steady.

Birmingham, Ala.—Production is being maintained at 70 per cent, a considerable proportion of the output being shipped to other districts.

Pacific Coast

Hoover Dam Award Opens Large Steel Tonnage for Future—Most Buying Is in Small Lots—Lower Water Rates from East Upset Market — Steel Pipe Awards Make Heavy Tonnage

San Francisco—(*By Air Mail*)—Demand eased off somewhat during the past week and with one or two exceptions, awards involved small lots. Of special importance was the award of the Hoover Dam project, Denver, to the Six Companies Inc., San Francisco, at $48,890,995. This project will require 120,000 tons of steel products, including 17,000 tons of reinforcing steel and over 9000 tons of structural steel. Prices remain unchanged.

Bars, Plates and Shapes

Awards of concrete bars were the smallest of any week so far this year and totaled less than 300 tons, bringing the aggregate for the year to 11,345 tons, compared with 8715 tons for the corresponding period last year. A school auditorium in Sawtelle, Calif., requiring 100 tons, went to an unknown company. Several large projects are up for figures or pending, including 200 tons for highway work in Imperial County, Calif. Out-of-stock prices in the San Francisco district continue 2.40c., to 2.50c, base, on carload lots, while Los Angeles quotations remain at 2.50c, base.

One of the largest plate projects ever placed on the Coast was awarded this week by the Southern Fuel Co., Los Angeles. This project called for 129 miles additional of 26-inch gas pipe. The Western Pipe & Steel Co. secured 18,000 tons for 76 miles and the A. O. Smith Corp. booked 12,000 tons for 53 miles. Bids were opened on 210 tons of 20-inch welded steel pipe for the East Bay Municipal utility district, Oakland, on which the Steel Tank & Pipe Co. was low. Los Angeles also opened bids on 4500 tons of 24 and 36-inch welded steel pipe. Prices are weak at 2.00c to 2.05c, c.i.f. Awards so far this year aggregate 56,054 tons, compared with 9519 tons for the same period in 1930.

Few structural lettings were reported. Awards aggregated 798 tons, bringing the total for the year to 19,055 tons, compared with 19,898 tons for the corresponding period last year. Important lettings included 240 tons for a bridge over Washington avenue, Los Angeles and 150 tons for two radio towers in the same city, both booked by the Pacific Iron & Steel Co. Bids will be opened April 29 for 300 tons for the Islais Creek bridge and March 25 for 320 tons for pier No. 15, both in San Francisco. Bids will be opened April 1 on 525 tons for a crossing over the Santa Fe tracks near Merced, Calif. Prices on plain shapes range from 2.05c to 2.15c, c.i.f.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Water Rate Is Unsettled

Seattle—While demand for iron and steel products is not active, gradual improvement is noted. New projects are developing slowly but the general outlook is more encouraging. Awards placed this week approximated 4000 tons.

Mill prices of basic items have weakened, current c.i.f. quotations being: Shapes, 2.05c, plates, 2.00c, and steel bars 2.15c. Reinforcing materials are nominally 2.30c, as heretofore, but desirable tonnages could probably be booked at less. The market has had no real test in recent weeks.

Intercoastal water rates on steel have also declined following dissolution of the conference. Whereas the former basic rate on steel was 32½c per 100 pounds, tin plate is reported to have been booked at 25c, shapes at 27½c, bolts, nuts, ingots, bars, billets and other items at 25c, while one line is said to have cut to 22½c. These lower freights are not responsible for the weakness in c.i.f. prices here. Neither have they stimulated new business. The uncertainty of the rate situation, on the other hand, is retarding buying because purchasers hesitate to place orders while conditions are so unstable.

Bars, Plates and Shapes

Concrete bar awards were the heaviest of any week this year and approximated 2500 tons. The largest, 1750 tons for the Seattle Ford plant substructure, went to the Pacific Coast Steel Corp., Seattle. Pioneer Sand & Gravel Co., which has just opened its Seattle plant for fabricating reinforcing steel, took 500 tons for the deck of the Lake Union bridge, Seattle, also about 100 tons for the Tacoma telephone building. Soule Steel Co., Portland, obtained 200 tons for the substructure of the Seattle federal building. Work has started on the $600,000 concrete bridge over the Rogue river, Gold Beach, Oreg. Mercer-Fraser Co., Eureka, Calif., has the general contract. An unstated tonnage of concrete bars will be furnished by unnamed interests. Washington State highway commission has opened bids for four bridges over the Twisp and Methow rivers, Okanogan county, Triangle Construction Co., Spokane, low at $37,784. Two other highway contracts, approximating $250,000, are also pending.

Two thousand tons of the 3300 tons of shapes required for the Seattle Ford assembly plant and awarded to Bethlehem Steel Corp., will be rolled by the local plant of the Pacific Coast Steel Corp. and fabricated by Wallace Bridge & Structural Steel Co., Seattle. The remainder will be supplied from eastern plants. The local contract includes angles, beam plates and channels. Poole & McGonigle, Portland, who are furnishing 1800 tons of shapes for the Meier & Frank department store, Portland, Oreg., have an additional contract for approximately 250 tons for two additional stories. Isaacson Iron Works, Seattle, has the contract for 100 tons for ship repairs.

Pipe Tonnage Is Small

Yakima, Wash., has awarded to American Cast Iron Pipe Co., Birmingham, Ala., through R. C. Polk, Seattle, 500 tons of 12 and 16-inch monocast. On the same job McWane Pipe Co. booked 100 tons of small sizes. Bellingham opens bids this week for 600 tons, Seattle will receive tenders for 900 tons next week. Two projects are pending in British Columbia, totaling 1500 tons.

Sprinklers Take Pipe

New Orleans—Contract has been awarded the Grinnell Co., Providence, R. I., for installation of a sprinkler system, covering wharves and sheds on the New Orleans waterfront, one of the largest ever placed and totaling well over $1,000,000. For this work, 120,000 sprinklers will be installed. Approximately 1,500,000 feet of steel pipe from ¾ inch to 8 inches in diameter will be used, or about 2200 tons.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought iron pipe, Pittsburgh base.

BUTT WELD

Steel In.	Blk.	Gal.	Iron In.	Blk	Gal.
⅛	58	44½	⅛	23	5
¾	62	50½	¾	28	11
1—3	64	52½	1 and 1¼	31	15
			1½ and 2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7 and 8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7 and 8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f.o.b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¼—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES COLD DRAWN

1	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill

Random lengths over 5 ft. 55%
Selected lengths, 1 to 18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir.....$37.00 to 38.00
Four-inch, Birmingham..... 41.00 to 42.00
Four-inch, Chicago ..... 46.20 to 48.20
Six to 24-inch, Chicago..... 42.20 to 44.20
Six-inch and over, N. Y..... 37.50 to 39.50
Four-inch, New York..... 40.50 to 41.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.85c
Detroit	3.00c
Houston	3.00c
Los Ang.	3.40c
New York‡(d)	3.10c
Philadelphia	2.60c
Pittsburgh	2.75c
Portland	3.15c
San Frans.	2.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFORC. BARS

Baltimore	2.50c-3.31c
Boston	3.265c
Buffalo	2.95c
Chattanooga	3.10c
Cincinnati	3.15c
Cleveland	2.25c-2.44c
Detroit	3.00c
Houston	3.00c
Los Ang. cl.	2.40c
Los Ang. lcl.	2.70c
New York	2.65c-3.10c
Phila.	2.40c-3.00c
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.50c
Seattle	3.15c
St. Louis	3.15c
Tulsa	3.65c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los Ang.	3.40c
New York(d)	3.10c
Philadelphia	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New York(d)	3.30c
Philadelphia	2.50c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	2.75c

NO. 10 BLUE

Baltimore	3.50c
Boston	3.915c
Buffalo	3.50c
Chattanooga	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.10c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)	3.00c-3.40c
Portland	4.00c
Phila.*†	3.05c
Pitts.**	3.10c
San Fran.	3.65c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.70c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Clev.***	3.75c
Detroit	3.75c
Los Ang.	4.70c
New York	3.50c-3.65c
Phila.*†	3.60c
Pitts.**	3.40c
Portland	4.50c
San Fran.	4.15c
Seattle	4.50c
St. Louis	4.05c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	5.45c
Buffalo	4.40c-4.60c
Chicago (local del.)	4.35c
Chicago (outside)	4.35c-4.60c
Cincinnati	4.40c
Cleveland	4.00c
Detroit	4.25c
Houston	5.40c
Los Ang.	5.10c
New York	4.00c-4.10c
Phila.*†	4.15c
Pitts.**	4.00c
Portland	5.00c
San Fran.	4.65c
Seattle	5.00c
St. Louis	4.60c
St. Paul	4.23c
Tulsa	4.60c-4.75c

BANDS

Baltimore	3.50c
Boston	4.015c-5.00c
Buffalo	3.50c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.10c
Det. 3/16-in. & lighter	3.30c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia	2.90c
Pittsburgh	3.10c
Portland	3.50c
San Fran.	3.75c
Seattle	4.15c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston	5.50c-6.00c
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.65c
Det. No. 14 & lighter	3.80c
New York	3.75c
Philadelphia	3.15c
Pittsburgh	4.10c
Seattle	5.15c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.35c
Cincinnati	3.80c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.40c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)	4.75c
St. Paul (a)	3.85c
St. Louis	3.60c
Tulsa	4.75c

Flats and squares 5c extra, except Tulsa, where 5.14c is quoted. (a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)	6.15c
Cincinnati	6.10c
Clev. (b)	5.95c
Detroit	5.40c
Phila. (c)	4.85c
New York	5.05c

(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.

A MESSAGE TO ALL USERS OF CHROME-NICKEL ALLOY TUBES

DUE to the severe operating conditions for which alloy tubes are purchased, the knowledge and experience of the tube manufacturer are as important to every buyer as the selection of the metal itself.

The manufacturer's knowledge and experience must be along two lines; first, *technical and metallurgical,* in order that the characteristics and limitations of the material may be accurately known;—and second, in *actual tube production,* in order that sound, quality tubing,—the manufacture of which differs greatly from ordinary steel tubing—may be supplied.

The Babcock & Wilcox Tube Company are pioneers in the commercial production of heat and corrosion resisting tubing, having produced the first of such alloy tubing in 1923. As a result of years spent in experimentation, and in actual tube production, The Babcock & Wilcox Tube Company has assembled a wealth of exclusive technical and metallurgical data—and has perfected alloy tube production methods to their present high standard of efficiency.

The B. & W. NIROSTA KA2 tube of today is offered to industry not only because of the superiority of the metal and the patented method of heat treatment, but because the manufacture of the tubes is entirely beyond the experimental stage, as the satisfactory service of thousands of these tubes in use today will testify.

THE BABCOCK & WILCOX TUBE COMPANY

BEAVER FALLS PENNSYLVANIA

Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 10.00c, Conn., for copper

Sheets	
Yellow brass (high)	17.25
Copper, hot rolled	19.87½
Lead, full sheets (cut ½c more)	8.50
Zinc sheet (100-lb. base)	9.50
Tubes and Pipes	
Seamless yellow brass (high)	22.12½
Seamless copper	22.37½
Rods	
Yellow brass (high, full turnings)	15.50
Naval brass	16.50
Anodes	
Copper, untrimmed	17.37½
Wire	
Yellow brass (high)	17.75

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass		
New York	6.75 to	7.00
Chicago	6.25 to	6.75
Cleveland	7.50 to	7.75
St. Louis	6.25 to	6.50
Heavy Yellow Brass		
New York	4.50 to	4.75
Heavy Copper and Wire		
New York	7.75 to	8.00
Boston	7.25 to	7.50
Chicago	7.50 to	8.00
Cleveland	7.50 to	7.75
St. Louis	6.50 to	7.00
Red Brass Borings		
New York	6.25 to	6.50
Yellow Brass Tubing		
Cleveland	4.50 to	4.75
Light Copper		
New York	6.75 to	7.25
Chicago	6.25 to	6.50
Cleveland	6.50 to	6.75
St. Louis		6.50
Light Brass		
Boston	3.50 to	3.75
Chicago	3.75 to	4.25
Cleveland	3.25 to	3.50
St. Louis	3.50 to	3.75
Zinc		
New York	1.75 to	2.00
Cleveland	1.25 to	1.50
St. Louis		2.00
Aluminum		
Clippings, soft, Cleveland	12.00 to	13.00
Clippings, hard, Cleveland	9.00 to	10.00
Borings, Cleveland	5.00 to	5.25
Mixed cast, Cleveland	5.00 to	5.50
Mixed cast, Boston	4.00 to	4.50
Mixed cast, St. Louis		4.50

Secondary Metals

Remelt aluminum No. 12	11.00 to 11.50
Brass ingots, 85-5-5-5	9.75 to 10.00

Metals

New Business Is Light While Most Prices Are Nominal—Copper Market Is Uncertain

New York—New business in nonferrous metals has been exceptionally light this past week with the result that prices have become largely nominal. Outstanding in the present situation is the uncertainty of the copper market.

Copper wire prices are based on copper at 10.25c, Connecticut, while other brass and copper mill products remain on the basis of 10.00c. The prolongation of this difference adds to the perplexity of market interests. Specifications on brass mill products have shown a little improvement.

Copper—Anxiety of custom smelters caused the market to drop to 10.00c, Connecticut, about a week ago. Only a small tonnage was offered at that figure and most sellers refused to meet it. The result was that a little buying caused some business to be done at 10.25c, but subsequently a limited tonnage remained available at 10.00c. In the past few days very little business has been done at either figure. Refined and blister stocks were cut over 8100 tons last month. Refined shipments showed little change from those of January, but production increased from the low point of the past few months.

Zinc—Prime western prices remain steady despite quiet demand. Smelters are reluctant to cut the market further. The ore market has been a little firmer with output reduced.

Tin—The market has been remarkably steady around 27.00c, as new business has been almost entirely lacking. It is said that group support in London keeps the price up. Shipments from the Straits so far this month have been extremely light but stocks in England continue to pile up.

Lead—New business continues limited to a few small lots for prompt shipments. Prices are unchanged.

Aluminum — Buying recently showed a little improvement and was said to be on account of a variety of products. Prices are unchanged.

Coke By-Products Steady; Production Held Down

New York—Distillate prices are steadier, with demand unchanged. Production is low, in accordance with current demand. Stocks are not accumulating, benzol and xylol being in short supply. Some benzol continues to move at 19.00c. The chemical trade is taking a fair volume, but industrial buying is slow. Phenol and naphthalene are unchanged at steady prices. Domestic buying of sulphate of ammonia constitutes the bulk of activity.

Coke By-Products

	Spot
Per Gallon, Producers' Plants, Tank Lots	
Pure benzol	$0.19 to 0.20
90 per cent benzol	0.19 to 0.20
Toluol	0.27
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.85 to $1.90

Quicksilver Is Quite

New York—Quicksilver is quiet at $100 to $101.

To Buy Canal Supplies

Washington—General purchasing officer, Panama Canal, takes bids March 27 on 5000 feet of sash chain, 10,000 pounds steel screw spikes, 9000 cap screws, 297 gross brass machine screws and 1000 pounds copper tracks.

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
March 11	10.00	10.37½	9.75	27.15	27.50	4.50	4.25	4.02½	22.90	7.25	35.00
March 12	10.25	10.37½	9.87½	27.12½	27.45	4.50	4.25	4.00	22.90	7.25	35.00
March 13	10.12½	10.37½	9.87½	27.05	27.40	4.50	4.25	4.00	22.90	7.25	35.00
March 14	10.12½	10.37½	9.87½	26.90	27.25	4.50	4.25	4.00	22.90	7.25	35.00
March 16	10.12½	10.37½	10.00	27.10	27.45	4.50	4.25	4.00	22.90	7.25	35.00
March 17	10.12½	10.37½	10.00	27.45	27.75	4.50	4.25	4.00	22.90	7.25	35.00

Europe

British Merchants Buying Continental Steel, Anticipating Tariff—Production Increases

London—(*By Cable*)—British and Continental markets continue depressed, and prices are weak. In England railroad material and pipe are the most active features. Birmingham merchants are buying Continental steel, anticipating an eventual tariff. Continental and Indian pig iron competition is keen.

The West Indies are buying galvanized sheets; the Continent and South America, tin plate; and Canada, steel. Improvement in the Indian political situation gives sheetmakers a more hopeful outlook. Poland and Czecho-Slovakia are obtaining orders for various steel products from the Russian soviet.

Production of pig iron in Britain in February totaled 320,200 tons, compared with 337,200 tons in January, and 607,000 tons in February, 1930. The daily average in February was 11,435 tons; in January 10,877 tons. Stacks in operation Feb. 28 numbered 81, two less than Jan. 31. February output of steel ingots and castings amounted to 486,400 tons, against 402,200 tons in January, and 776,400 tons in February last year. Daily average in February was 17,371 tons, an increase of 33 per cent over January.

British iron and steel imports in February were 177,056 tons, compared with 221,773 tons in January. Exports totaled 143,525 tons against 167,373 tons in January.

French Coke Output Gains

Paris—Output of coke at French collieries in 1930 was 5,054,812 metric tons, against 4,769,228 tons in 1929, an increase of 6 per cent. Imports of coke in 1930 totaled 4,565,490 metric tons, compared with 5,444,644 tons in 1929, a decrease of 16.2 per cent. Exports of furnace coke in 1930 were 330,036 metric tons, against 468,824 tons in 1929. In December, 1930, production was 423,804 tons, imports 337,740 tons and exports 30,921 tons.

British Steel Fails To Find Expected Upturn

Birmingham, Eng.—British iron and steel markets are cheerless and the end of the second month finds traders no better off than when the year opened. In a few cases the position is slightly worse, but this is not the general experience. Middlesbrough steelworks have made increased sales in February although the difference in the first two months is only slight.

Further orders have been placed for railroad material on the northeast coast and prospects are considered brighter for bridge work. The dearth of shipbuilding specifications, however, is a serious matter for the steel mills on the northeast coast. Practically no new orders are being given out for ships in that district, although on the Clyde a contract has been completed this week for a vessel of 2000 tons. Steelworks in the Black Country around Birmingham are short of specifications and with few exceptions mills are not rolling more than about three days a week.

Midland pig iron business is limited to small quantities for early delivery. Customers have a grievance inasmuch as other districts are able to obtain Midland pig iron at much lower prices than those prevailing in Black Country zones. The Central Pig Iron Producers association, however, has set up a rigid control over delivery prices for the Midland area and shows no sign of further concessions.

Inquiry for Continental steel is quiet in the Midland district. Merchants are doing little business and February has been a poor month. Prices are weak, especially for French and Belgian semifinished steel. Germany, having sold her quota of billets, is asking somewhat stiffer rates but the French and Belgian price is about £4 7s 6d ($21.25) delivered in Birmingham.

Last week 1000 tons of steel billets were unloaded in the Tees. Small steel bars from the Continent cost about £5 ($24.30) delivered and No. 3 Belgian iron bars can be had at the same price. But merchants

Current Iron and Steel Prices of Europe

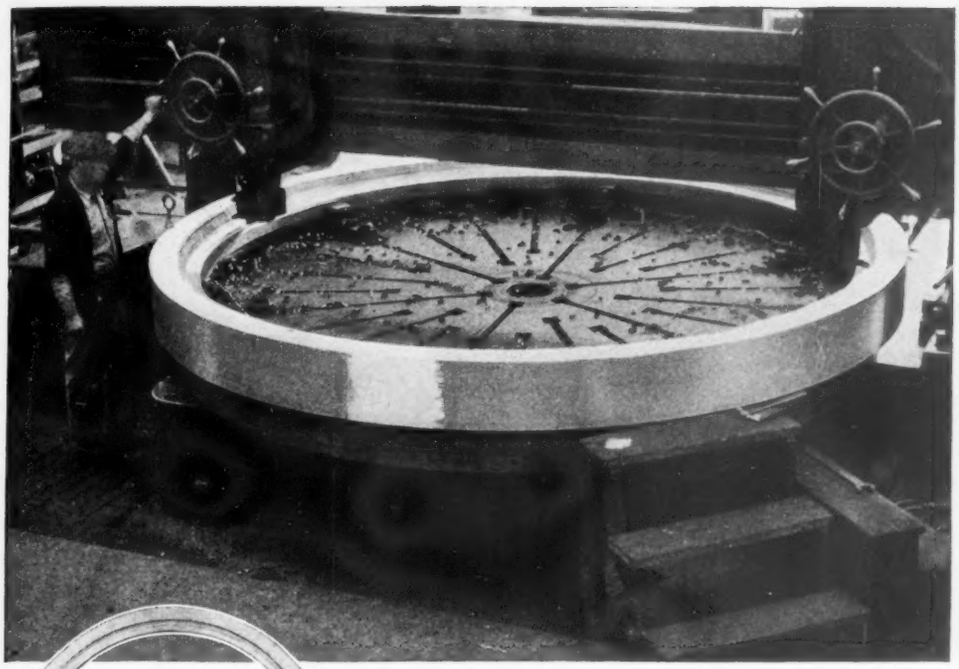
Dollars at Rates of Exchange, March 16	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f.o.b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3**.....	$14.22	2 18 6*	$11.66	2 8 0	$11.66	2 8 0	$12.15	2 10 0
Basic-bessemer.....	14.58	3 0 0†	11.54	2 7 6	11.54	2 7 6	13.37	2 15 0
Hematite, Phos. .02-.05	16.77	3 9 0	.....	.....	.....	.....	17.01	3 10 0
SEMIFINISHED STEEL								
Billets.....	$26.73	5 10 0	$15.92	3 5 6	$15.92	3 5 6	$16.04	3 6 0
Wire rods.....	41.31	8 10 0	29.16	6 0 0	29.16	6 0 0	29.16	6 0 0
FINISHED STEEL								
Standard rails.....	$40.10	8 5 0	$31.59	6 10 0	$31.59	6 10 0	$31.59	6 10 0
Merchant bars.....	1.68c	7 15 0	.83c	3 15 6	.83c	3 15 6	.86c	3 18 0
Structural shapes.....	1.68c	7 15 0	.75c	3 8 6	.75c	3 8 6	.77c	3 10 0
Plates.....	1.79c	8 5 0	.96c	4 7 6	.96c	4 7 6	.99c	4 10 0
Sheets, black, 24 gage	1.90c	8 15 0	1.80c	8 4 0	1.80c	8 4 0	1.93c	8 15 0
Sheets, gal., 24 ga. corr.	2.71c	12 10 0	2.23c	10 2 6	2.23c	10 2 6	2.31c	10 10 0
Bands and strips.....	2.06c	9 10 0	.96c	4 7 6	.96c	4 7 6	.99c	4 10 0
Plain wire, base.....	2.06c	9 10 0	1.10c	5 0 0	1.10c	5 0 0	1.16c	5 5 0
Galvanized wire, base..	2.39c	11 0 0	1.46c	6 12 6	1.46c	6 12 6	1.43c	6 10 0
Wire nails, base.....	2.39c	11 0 0	1.13c	5 2 6	1.13c	5 2 6	1.16c	5 5 0
Tin plate, box 108 lb...	$ 3.77	0 15 6	.....	.....	.....	.....	$ 8.75	1 16 0

Domestic Prices at Works or Furnace—Last Reported

			French Francs		Belgian Francs		Renten Marks	
Fdy. No. 3 Pig Iron**	$14.22	2 18 6	$11.37	290(2)	$13.11	470	$18.58	78
Basic pig iron.....	14.58	3 0 0	12.74	325(1)	12.28	440	20.36	85.50
Furnace Coke.....	2.92	0 12 0	6.19	158	5.02	180	5.10	21.40
Billets.....	26.73	5 10 0	19.21	490	18.00	645	26.31	110.50
Standard rails.....	1.79c	8 5 0	1.41c	785	1.57c	1,210	1.37	127
Merchant bars.....	1.68c	7 15 0	.95c	530	.93c	715	1.38c	128
Shapes.....	1.90c	8 15 0	.99c	550	.92c	705	1.35c	125
Plates.....	1.95c	9 0 0‡	1.37c	760	1.09c	835	1.58c	147
Sheets, black, 24 gage	1.90c	8 15 0	2.33c	1,295	2.34c	1,800	1.26c	117
Sheets, gal. 24 ga., corr.	2.39c	11 0 0	2.80c	1,555	2.73c	2,100	3.56c	330
Plain wire.....	2.06c	9 10 0	2.16c	1,200	2.15c	1,650	2.24c	207
Bands and strips.....	2.06c	9 10 0	1.25c	695	1.27c	975	1.60c	148

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £16 9s 0d ($79.95) delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f. o. b.; **Silicon 2.50-3.00. British quotations are for basic openhearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.

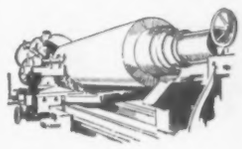
ANOTHER MIDVALE LARGEST



TYPICAL OF INDUSTRY'S increasing demand for better tools is the giant gyro-stabilizer now being assembled at the Lester plant of the Westinghouse Electric and Manufacturing Company. For it Midvale made the largest ring forging ever known. This huge alloy steel precession ring measures 153.5″ O. D., 134″ I. D., and 12″ in width. Finished machined it weighed 7,950 pounds.

The casting, the shaping, the machining of this ring was each a problem in itself — typical of the steel problems Industry brings to Midvale to solve. If you are faced by any such problem, call on The Midvale Company at its nearest office — Philadelphia, New York, Washington, Pittsburgh, Cleveland, Chicago or San Francisco.

MIDVALE



TOOL STEEL

Midvale does not follow the "tonnage" method of tool steel production. Midvale charges with cold metal. Lets the ingots cool, to permit inspection for faults. Carefully chips out any cracks. Reheats ingots and reduces to billet size. Sand-blasts the scale. Again inspects and chips when necessary. Reheats and rolls to finished size. This is the only method by which tool steel of Midvale quality can be produced.

MIDVALOY HR

Midvaloy H R fits a surprising number of needs. Its heat-resistant and corrosion-resistant qualities make it both efficient and economical for high temperature operating conditions. Successful installations with Midvaloy H R include: continuous furnace parts, retorts, boxes, recuperator tubes, stoker grates, tuyeres, chains, slicing links, sulphide roasting furnace parts, oil refining furnace parts, cast pyrometer tubes and gas industry equipment.

agree that there are practically no buyers.

The market for steel scrap continues weak. Prices are nominal as so little business is being transacted. Steelworks are booking odd parcels but for the most part deliveries are suspended indefinitely. Merchants have to accept the best prices obtainable and for delivery into South Wales they consider this about £2 6s ($11.17). In the Black Country no more than £1 17s 6d ($9.12) could be obtained for steel scrap and in the case of turnings merchants state that it is impossible to define any definite price.

In the Staffordshire finished iron trade puddling furnaces and mills are working irregularly. Marked bar makers are relatively well situated but makers of strip and crown iron are struggling to keep mills at work for about three days a week. The pressure of competition is bringing down the price gradually in crown iron.

Metal Market Shows Gain

Overseas orders for galvanized sheets continue limited. The few orders that are being taken for India represent a light tonnage.

The metal markets have taken a firmer tone this week and tin values have shared in the uplift. On the strength of this some tin plate producers are asking a higher price and the Welsh market has been stimulated to a small degree. The minimum price is 15s 3d ($3.70) per basis box but makers are holding out for 15s 9d ($3.82) although their idea of prices differs from that of consumers.

Australia has booked some substantial contracts this week and prospects there are more encouraging. The Continent is fairly quiet although some inquiries may mature in the next few days. Shipments from Swansea last week showed an improvement of some 24,000 boxes, although stocks in warehouses are abnormally heavy. Output continues at just under 50 per cent. Many works are on short time and in one instance 28 days notice has been given the workmen in view of scarcity of orders on the books.

John Brown & Co. Ltd., Atlas Works, Sheffield, has booked orders for 700 tires, 24 pairs of tired wheels and axles, and 76 nickel steel axles for a tramway system at Montevideo and a quantity of springs for the Buenos Aires tramways. In addition the company is executing a South American order for 1250 beater bars, for threshing machines.

1930 Belgian Output Low

Brussels—Production of steel ingots and castings in Belgium during 1930 was 3,389,590 metric tons, compared with 4,132,410 tons in 1929, a decrease of 18 per cent. Strangely enough, the output during December, 1930, was the highest since May of that year, although well below the monthly average of 1929.

Production of pig iron in 1930 totalled 3,393,540 metric tons, compared with 4,095,940 tons in 1929, a decrease of 17.2 per cent. The December output was 270,520 metric tons, this figure also being higher than any month since May. The following table gives monthly figures for 1930, compared with the monthly averages of 1929, the two preceding years and 1913, in metric tons:

Mon. ave.	Act. Furn.	Pig iron	Steel ingots and castings	Finished steel
1913	....	207,055	205,550	154,920
1927	....	312,620	309,040	255,185
1928	....	325,445	327,870	281,125
1929	58	341,330	344,370	296,370
1930				
Jan.	58	343,380	340,200	296,220
Feb.	57	315,320	321,480	271,430
Mar.	57	341,820	359,150	258,770
April	56	313,250	312,550	252,150
May	54	299,510	294,160	240,900
June	51	265,290	252,680	204,590
July	49	259,750	263,980	209,060
Aug.	47	246,740	244,870	206,020
Sept.	46	250,630	254,280	202,970
Oct.	43	248,550	252,340	220,810
Nov.	44	238,780	222,210	193,570
Dec.	44	270,520	271,690	221,860
Total		3,393,540	3,389,590	2,778,350

German Steel Sees No Signs of Improvement

Berlin—The annual report of the Vereinigte Stahlwerke, which concern, as already reported, had to reduce its dividend from 6 to 4 per cent, is unsatisfactory. Sales during the past financial year decreased by only 13.5 per cent, but the net profit by about 35 per cent. Owing to stagnation of business, the value of material stocks during the year advanced by almost 80,000,000 marks to 269,700,000 marks, the stocks of coal, ores, and pig iron in particular having substantially increased. As a result debts have further grown, the short-term obligations now being 237,200,000 marks, or 60,000,000 marks more than last year's figure.

Resulting from the reduction of the dividend of the Vereinigte Stahlwerke, the Gelsenkirchen Mining Co., the Phoenix Mining Co. and others also will have to reduce their dividends. The Mitteldeutsche Stahlwerke, which last year produced 467,572 metric tons of raw steel, against 538,167 tons a year before, announced a reduction of dividend from 8 to 6 per cent.

These developments reflect the unsatisfactory state of affairs in the German heavy industry, which continues after a slight revival. Domestic business is practicalyy stagnant, as the expected improvement of sales has not yet materialized. Activity at most plants is 30 per cent less than a year ago, and the stringent financial situation of public utility companies, municipalities, government and railroads does not leave much chance for improvements soon. It is gratifying to state that, contrary to daily reports of further dismissals of workers and closing down of plants, sales of special steels have improved, and, in fact, the Deutsche Edelstahlwerke was in a position to cancel the dismissal of 250 workers.

Price Difficulties Involved

In the export section receding prices continue to curtail activity. Competition from western European countries again is keener. It is reported that merchant bars are offered by the Belgians at as low as £3 18s ($18.87), whereas German manufacturers are trying to sell at about £4 ($19.40), which, of course, results in further restriction of business. The price of structural shapes has receded to about £3 13s ($17.67). The anticipated increase of foreign orders, in view of the approaching season, has not yet materialized. In particular the Far East, and also the Dutch East Indies and China, are small buyers, the same being true with regard to South America.

Sales of wire have scarcely improved and depressed prices do not leave much profit to manufacturers; £6 15s ($32.70) is asked for galvanized wire and £9 5s ($44.85) for barbed wire. It is stated that exports of wire and wire products in 1930 were about 25 per cent smaller than in 1929.

The production of pig iron further declined from 614,844 metric tons in December, 1930, to 603,104 tons in January. Of 163 blast furnaces, only 69 now are in blast.

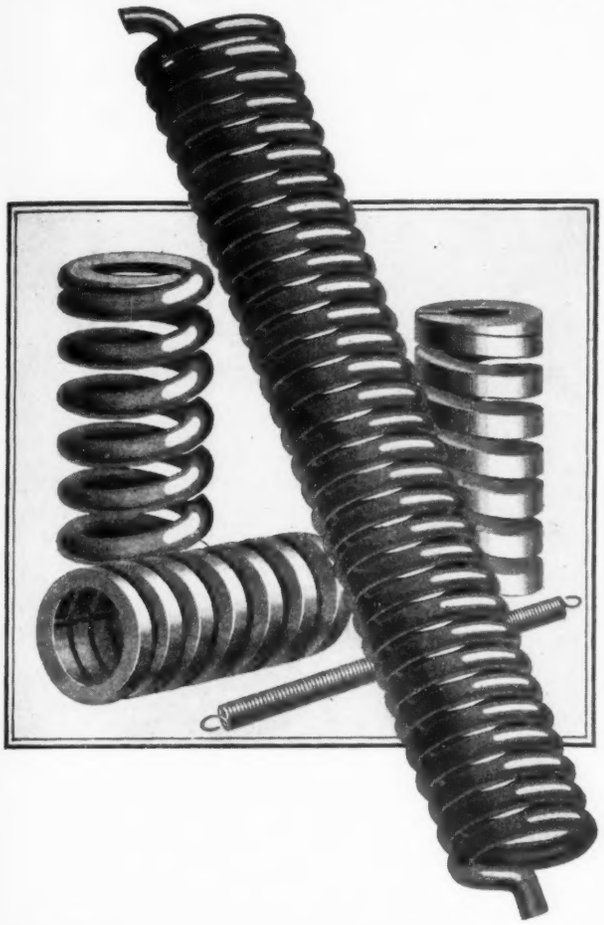
Middlesbrough Exports Low

Birmingham, Eng.—It is necessary to go back to 1926 to find figures comparable with those just issued for exports of iron and steel from Middlesbrough in February. The improvement in January was not maintained, for while pig iron shipments in January were 14,222 tons, February reached only 11,380. Of this 3782 tons went abroad and 7598 coastwise. The best customer and the only country taking over 1000 tons was Italy, which bought 1360 tons. Norway took 885, Germay 505, France 370 and Belgium 350.

A slight improvement in shipments to India and Africa took place in steel but none went to the Argentine and only about 60 tons to Australia. Total shipments were 15,478 tons of which 9845 went to British ports at home and 15,633 went abroad. The best tonnage was India, taking 4529 tons of steel. South Africa bought 3578 and Portuguese East Africa 2386 tons. Kenya bought 1101 tons.

Making Cents Save Dollars

with Springs that Eliminate Replacement



Unfailing service in every day use expresses quality. The tying up of costly equipment, because of a spring failure, means dissatisfied customers and expensive replacements that wedge into profits. Buying from a reliable source—spending a few more cents for proved quality—will in the end save many dollars for you.

It will pay you to investigate why most manufacturers specify American Quality springs.

Quality Springs

1831 — COMMEMORATING 100 YEARS of PROGRESS in WIRE MAKING — 1931

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago — SUBSIDIARY OF UNITED STATES STEEL CORPORATION — And All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

Export Distributors: United States Steel Products Company, New York

Machinery

MARCH continues to drag as far as machine tool business is concerned, with a few exceptions. Detroit is one fairly bright spot, with some business actually being placed and with real future prospects. One well-known builder of automatic machinery, located in New England, has increased operating schedules from three to four days per week—mainly on account of orders received from the automotive industry. This condition also is reflected in somewhat improved conditions among manufacturers of production grinding machines. Orders continue to be placed by Russian interests in volume well worthy of attention.

New York—Machine tool buying and inquiry continue to reflect spotty demand. While many dealers and builders report volume holding to the February rate, some note a decrease both in orders and inquiry. On the whole, however, inquiry is fairly active, although buyers of equipment are slow to release funds for expansion. Most orders are for replacement.

Universal Winding Co., Providence, R. I., is reported to have placed about 10 machines, including several types of lathes. Bids are in on two railroad lists, but neither has been closed. One may be subject to delay. The navy department continues to take bids for shop requirements at yards throughout the country. Operating schedules of ball bearing plants continue to be erratic.

Worcester, Mass.—March is proving to be a disappointing month in the machinery market. The same lethargy which stifled production in January and February persists and apparently many machine tool men are resigned to an entire first quarter marked by about the same unsatisfactory level set by its first two months.

Lathes and drills are showing few signs of activity. Grinders, on the other hand, having the benefit of foreign demand, are maintaining the production rate of the first two months with indications of additional improvement. From a domestic point of view, however, not much has been gained.

The industry as a whole is marking time, with indications of increasing inquiry but few orders actually closed. Some builders estimate that four to five months more will pass before domestic buying will have accelerated the market to any extent.

Some navy department inquiry, now several weeks old, has yet to be closed and New England builders are not profiting materially in that direction.

Pittsburgh—The machinery market is slightly less active, inquiry having declined from the improved level of recent weeks, while awards generally fail to show improvement. Both orders and inquiry are confined to small scattered lots and incoming business shows little change over that of a month ago. A fair volume of pending work remains on the books.

Cleveland—Proximity to Detroit, where automobile production is on the upgrade and where it is predicted that April will be a 400,000-car month, is having much to do with the optimism maintained by Cleveland machine tool men in the face of otherwise discouraging conditions. All is not rumor as far as this Detroit situation is concerned—machine tools in small but encouraging lots are being sold to the automotive industry and there appears to be a real future in that direction.

In other respects, March is proving a bitter disappointment, at least it is to any who expected general recovery in machinery buying this early in the spring. Even small tools are not being sold without great effort which eats into the profits unless such effort be charged in part to promotion of future business, as it properly should be. The only items which are selling themselves are repair parts, the depression having given a new lease of life hundreds of old machine tools.

Whatever the state of affairs in Russia may be, it is certain that machine tool orders placed by Russian interests will continue to be of utmost importance to builders of production machinery in the Cleveland district. These orders have been major factors in preventing complete shutdowns during the lowest ebbs of the domestic market, and many workmen thereby have earned their living through these trying periods of recent date. Russian orders still are being received with keen satisfaction.

The employment situation generally remains unchanged as far as numbers employed are concerned, although several companies report longer working days and even more days of work per week for workmen already on their payrolls.

Chicago—With March more than half gone, machine tool builders in this district have virtually given up hope of a spring upturn in buying. Several houses report orders below February, and the volume far below the hopes for March. Chicago, Great Western and Burlington railroads each have lists against which buying is expected momentarily, but these orders have been much delayed. Santa Fe is asking bids on a pipe machine and two cut-off machines. Other western railroad inquiry is negligible. A local steelworks is expected to place some orders soon. A few light production tool orders have been closed. More activity is in sight in the Milwaukee district, as several of the road machinery and excavating equipment makers have programs in contemplation.

Bureau of Census Report Covers Electric Hoists

Monthly statistics on new orders and shipments of electric hoists now are being compiled by the bureau of the census, Washington. These statistics, which are based on data reported by 13 leading manufacturers, are presented in tabular form with comparative figures back to the beginning of 1925, and also in graphical form with charts of the past two years for comparison.

According to the first of these reports, just issued, new orders for January, 1931, amounted to 400 with a value of $155,972. Shipments to the value of $134,472 were reported during that month. Figures for December, 1930, were: 231 orders with value of $126,592, value of shipments, $106,459.

Navy Will Take Bids on Steel Products

Washington—Bureau of supplies and accounts, navy department, takes bids on the following materials, for various yards on the dates named: Brooklyn, 10,000 pounds seamless drawn brass pipe, March 24; Newport, 51 steel forgings, schedule 5323, March 24;San Diego, one hardening furnace and equipment, March 31; Norfolk, 67,100 pounds, plate steel; 14,200 pounds, manganese bronze; and 2050 pounds, bar brass, March 31; Boston, 4330 pounds, steel propeller shafts, March 31; Mare Island, 6600 feet, seamless steel tubing, March 31.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

WATERBURY, CONN.—Bristol Co., manufacturer of recording instruments, proposes a plant extension to cost $45,000 with equipment.

WATERVILLE, CONN. — Blake & Johnson Co., manufacturer of screw machine products, has let contracts for a plant addition. Estimated cost, $20,000.

BOSTON—Somerville Iron Foundry Co., 88 Washington street, Somerville, Mass., advises through M. D. Bingham, president, that the company does not contemplate any building, recently noted as planned for erection here. (Noted March 12.)

EAST LONG MEADOW, MASS.—Central Massachusetts Electric Co., 406 Main street, Palmer, Mass., will build a substation here, to cost $50,000 with equipment. Plans are private.

FITCHBURG, MASS. — Automatic Heating Co. has been incorporated by Carlton B. Lancey, Lunenberg, Mass., and Ivan M. Damon, Ashby, Mass., to make heating appliances.

LOWELL, MASS.—City has private plans for the erection of an addition to a municipal pumping station on West Sixth street. Cost is estimated at $40,000.

QUINCY, MASS.—Quincy Pump Co., 24 Bell street, has started the manufacture of engines and machines.

TOWNSEND, MASS. — Browning-Drake Radio Corp. has been incorporated with $10,000 capital by William T. Miller, Newton, Mass., and Thomas R. Whitney, Waltham, Mass., to manufacture radios.

NEWPORT, R. I.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 24 on schedule 5345 for one electric butt welder, for delivery to the naval torpedo station here.

NEWPORT, R. I.—Bureau of yards and docks, navy department, Washington, advises that bids will be called April 1 for construction of an assembly shop extension at the naval torpedo station, recently noted as planned for erection here. Two small cranes are included. (Noted March 12.)

New York

BROOKLYN — Signal supply officer, New York general depot, army base, will receive bids March 31 for 18 motor-generator sets on army specification 285-E.

BUFFALO—University of Buffalo has filed plans for a power plant to be erected at an approximate cost of $200,000.

BUFFALO—Lake Erie Engineering Corp., 268 Perry street, manufacturer of boilers, machinery and castings, is moving to make way for a terminal development. Plans are being drawn for a new plant to be erected in the Tonawanda district and contract is to be awarded this month. Occupancy is planned for August 1. Estimated cost, $300,000.

NEW YORK—Fire Stop Can Co. has been incorporated with $100,000 capital by C. Firestone, 220 Broadway, to deal in cans.

NEW YORK—Aluminum Roofing & Sheet Metal Works has been incorporated with 100 common shares by P. D. Greiff, 291 Broadway.

NEW YORK—Miller Wheel Corp. has been incorporated with 200 common shares by Newgass, Nayfack & Waldheim, 350 Madison avenue, to make metal wheels.

NEW YORK—Mueller Valve & Tap Corp. has been incorporated with $10,000 capital by W. B. Davis, 233 Broadway, to deal in steam specialties.

NEW YORK—Gramercy Brass Turning Co. has been incorporated with $25,000 capital by Shorr, Brodsky & King, 799 Broadway, to deal in tools.

NEW YORK—J. J. Dietz, commissioner of the department of water, gas and electricity, has preliminary plans for a pumping station to be built at a cost of about $500,000.

NEW YORK—Lewyt Metal Products Co., 120 East Thirteenth street, organized as a division of Novelty Wire & Metal Works, will specialize in the manufacture of stamped, formed, welded and fabricated sheet steel products.

New Jersey

BRUNSWICK — Metallo Gasket Co., 16 Bethany street, has let contract to Milltown Realty & Construction Co., Main street, Milltown, N. J., for a 2-story plant addition. Cost is estimated at $40,000.

LONG BRANCH—W. E. Herbert, 376

Large Window Space in New Machine Shop

MAXIMUM light and ventilation were provided in the recently completed machine shop of Shaffer Specialty Co., Tulsa, Okla., manufacturer of oil field supplies. The plant building is 60 x 260 feet and with actual floor space of approximately 13,000 square feet, there is a total window expanse of about 6000 square feet. The machine shop assembly, 26 x 140 feet, is flanked on both sides by a continuous window area. All window sash are of steel and were manufactured by Detroit Steel Products Co., Detroit.

Walburton place, manufacturer of sheet metal products, plans to build a 1-story plant addition. Estimated cost, $18,000.

NEWARK—Meyer-Lewis Corp., 244 South street, advises through A. Lewis that the company has an assembly and shipping plant here for metal specialties and metal art goods. Company is in the market for unfinished and finished gray iron castings and for stamped metals. (Noted March 12.)

Pennsylvania

CORRY—Standard Automatic Products Co., L. T. McElroy general manager, 611 West Main street, proposes to build a 1-story plant, work to start about June 1. Cost is estimated at $40,000.

ERIE—Erie Foundry Co., manufacturer of forge shop equipment and sheet mill machinery, advises through D. A. Currie, vice president and general manager, that construction work on an addition will not proceed immediately, plans being prepared for future use. Plans call for a considerable extension to the company's machine shops, and when extension is erected, a few large machine tools will be purchased. (Noted March 12.)

MILLERSBURG—Miller Single Trigger Co. has been incorporated with $5000 capital by J. S. Blankenhorn, box 454, Harrisburg, Pa., to manufacture and sell fire arms and appliances.

PHILADELPHIA — Walls Owen & Stambach Co., Eleventh and Ridge avenues, has awarded contract to A. H. Spenard, 822 Wood street, for plant alterations, estimated to cost $3400.

PHILADELPHIA—Snyder Inc. has been incorporated with $25,000 capital by Benjamin L. Snyder, 5641 Woodcrest avenue, to manufacture and deal in electrical and mechanical appliances.

PHILADELPHIA — Machinery Products Corp. has been incorporated with 1000 no par shares by S. M. Curran, 1120 Vine street, to manufacture and sell machinery, mechanical devices and equipment.

PHILADELPHIA — G. W. West Foundry & Machine Co. has been incorporated with 100 no par shares by David H. H. Felix, 1416 South Penn square, to manufacture articles of iron and to conduct a foundry business.

PHILADELPHIA — Bureau of supplies and accounts, navy department, Washington, will receive bids March 24 on schedule 5331 for one horizontal boring, drilling and milling machine, for delivery to the navy yard here.

PHILADELPHIA—Ajax Metal Co., 46 Richmond street, has let contract to Cramp & Co., Penrose and Gallows streets, for a plant addition to be built at Frankford avenue, Canal and Laurel streets. Plans are by M. Ward Easby Inc., Schaff building. Cost is estimated at $150,000.

PHILADELPHIA—Autogiro Specialties Co., with offices at 900 Victory building, 1011 Chestnut street, has been organized to manufacture and sell Autogiro accessories under license of Pitcairn-Cierva Autogiro Co. of America. Joseph S. Pecker is chief engineer and Harold F. Pitcairn is president.

PHILADELPHIA—Philadelphia Rapid Transit Co., Mitten building, advises through C. J. Kelley, assistant comptroller, that alterations to the company's car shops will include a crane runway extension for the installation of two and three-ton cranes. (Noted March 5.)

PITTSBURGH—National Lead & Oil Co., 1376 River avenue, plans to rebuild a portion of its plant recently damaged by fire. Loss was estimated at $40,000.

PITTSBURGH — Superior Railway Products Corp. has been incorporated with $50,000 capital by Clara L. Diederich, 424 Stratton lane, to manufacture and deal in blowers, machinery and other metal products.

PITTSBURGH — National Type Foundry has been incorporated with $25,000 capital by Ralph Meyer, 705 Center avenue, Avalon, Pa., to manufacture type and other printers' products.

PITTSBURGH — Mayer Body Corp., W. G. Mayer president, 6459 Frankstown avenue, will award contract for two plant additions, to be erected from plans by Lake & Davidson, Negley building. First unit is to be 1-story, 30 x 100 feet and second is to be 2-story, 50 x 100 feet.

SPRINGDALE—Springdale Foundry Co. has been incorporated with $50,000 capital by George Chismark, West Seventh avenue and Mill street, Tarentum, Pa., to manufacture and sell iron, steel, brass and other metal castings.

WELLSBORO — Chamber of commerce advises through Robert L. Lyon, executive secretary, that plant which recently was noted as subject of negotiations would require a steam hammer, lathe, shearing equipment, etc., and occupy a space about 90 x 100 feet. Secretary also is in correspondence with another interest, considering erection of a small foundry here. (Noted March 12.)

WHEATLAND—Wheatland Tube Co. has been incorporated with $500,000 capital by Edward F. Maneely, 2017 North Broad street, Philadelphia, to manufacture and deal in tubes, pipes and other iron and steel products.

Ohio

COLUMBUS — Ohio Road Improvement Co. will act as sales agent for interests said to have acquired a 75-acre site near here for a stone-crushing plant. Company is expected to have operations under way next summer.

CLEVELAND—Composite Tube Co. has been incorporated with 250 no par shares by Emil M. Linderme Jr., president of the Linderme Tube Co., 1291 East Fifty-third street. New company will manufacture nonferrous metal alloy tubing.

LAKEWOOD — City council has awarded contract to Super-Built Construction Co., Union building, Cleveland, for a municipal incinerator plant at Berea and Fischer roads. Structure will cost approximately $50,000 and equipment $25,000.

PORTSMOUTH—Norfolk & Western railroad, W. P. Wiltsee architect, First National Bank building, will build a boiler house at Sixteenth and Chillicothe streets, at a cost of about $20,000.

SANDUSKY—Sandusky Metal Products Inc. has been incorporated with 200 no par shares by David Perris, 1218 Standard Bank building, Cleveland.

YOUNGSTOWN — Mahoning Valley Heating Co. advises that a plant has been leased at 1224 Market street, to be equipped principally with machinery already secured. W. L. Coppenbarger is president.

Indiana

INDIANAPOLIS—Aviation Corp., operator of Embry-Riddle Air Lines, now located at Mars Hill airport, is reported to be investigating sites at the municipal airport for a hangar and shops building, and to be considering erection of the unit on a new site.

SOUTH BEND—Sibley Machine Co., manufacturer of upright drilling machines, advises through B. J. Voll, general manager, that the company will not purchase any equipment or machinery at the present time. (Noted March 12.)

Michigan

ADRIAN—Taylor Detroit Mfg. Co. Inc., 338 Mack street, Detroit, will move operations here, according to the local chamber of commerce, and occupy the former plant of the Raymond Garage Equipment Co. of South Center street. H. C. Taylor is president. Company makes theftproof devices and metal stampings.

BATTLE CREEK—Purity Stamping Co. is reported to have started construction of a plant addition. L. J. Sarvis is architect.

CALUMET — Seneca Copper Mining Co., 11 Park place, New York, plans power plant improvements here, to include compressor plant and pumping plant.

DETROIT—War department, Washington, is having plans prepared for a warehouse, machine shop and assembly building to be built at Selfridge field.

GRAND RAPIDS — Monarch Road Machinery Co., 327 Front avenue northwest, has been incorporated with $25,000 capital by George A. Jackoboice, 136 Mt. Vernon avenue, to manufacture and sell road scrapers.

LANSING—Dail Steel Products Co., E. I. Dail manager, will add to its

facilities for immediate initiation of production on a new type of furnace designed by C. I. Murdock, Ann Arbor, Mich. Product is constructed of alloy sheet steel.

Illinois

BATAVIA—Batavia Body Co., whose incorporation recently was noted, advises that the company has taken over the Newton plant of Batavia, which has been operated by Emerson-Brantingham Corp. in the production of wagons and commercial bodies. Latter company owns all stock of the Batavia company, which is organized as a separate institution. A. T. Jackson is president of the Batavia company and C. M. Vogel is vice president in charge of production and purchases. (Noted March 12.)

CHICAGO—Elevator Mfg. Co. of America, 1741 Dickinson street, has been incorporated with 15,000 no par shares by Ogren & Cross, 100 West Monroe street, to deal in elevators.

CHICAGO—Lindberg Machine Works Inc., 528 North Western avenue, has been incorporated with $100,000 capital by G. A. Bosomburg, One North LaSalle Street building, to deal in laundry machines.

CHICAGO—All Steel Press Co., 847 West 120th street, has acquired quarters for the manufacture of punch presses, forging presses, press brakes, forming dies and other metal products. (Noted Feb. 26.)

CHICAGO—Edward Katzinger Co., 1949 North Cicero avenue, manufacturer of tinware, is taking bids for a 2-story addition to its plant. Unit will be 210 x 220 feet. Cost is estimated at $150,000.

WAUKEGAN — Plant of the Standard Welding Co. recently was damaged by fire. Estimated loss, $40,000.

Southern States

WASHINGTON—Bureau of supplies and accounts, navy department, will receive alternate bids March 31, for delivery to Hampton Roads, Va., or San Francisco, for two motor-driven bumping hammers, riveting hammers and riveters, one high speed sensitive drill, one metal cutting band saw, one blower, one bending brake machine, and a power squaring shear. Bids will be received April 7 for one electric furnace for heat treatment of aluminum alloy parts.

SARASOTA, FLA.—Williams Flying Service, municipal airport, plans erection of a new hangar unit.

BOWLING GREEN, KY.—Kentucky-Tennessee Light & Power Co. will resume work on a hydroelectric project on the Barren river near here. Estimated cost, $1,000,000.

LOUISVILLE, KY.—City will make improvements at Bowman field, to accompany construction of an army hangar, to be erected at a cost of about $100,000.

SHREVEPORT, LA. — Atlas Pipe Line Co., J. F. Atkins secretary, advises that a pipeline will be built to the East Texas oil fields, one main line pumping station to be erected at this time.

HAMPTON ROADS, VA.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 31 for two double wheel bench grinders, on schedule 5354.

NORFOLK, VA. — Hampton Roads naval operating base will build a plumbing shop addition, contract for which is held by E. E. Weddle Co. Contract for a pattern shop addition is held by S. S. Toler & Son, Rocky Mount, Va.

Missouri

ST. LOUIS—Luscombe Co. has been incorporated with $50,000 capital by Don Luscombe, Moline, Ill., to manufacture airplanes.

Oklahoma

OKMULGEE—Inland Iron Works Co. has been organized by officials of Joplin Machinery & Electric Co., Joplin, Mo., to operate a plant here with a foundry for the manufacture of aluminum, brass and bronze. L. T. LeBow is president.

TULSA — Southern Kansas Stage Lines Inc., 435 West Second street, Wichita, Kans., will build a truck terminal here, with a repair shop. Site 140 x 150 feet at Brady and Cheyenne streets will be used.

TULSA—Erie Meter Systems Inc., Wagner avenue and Pearl street, Erie, Pa., advises that branch plant recently acquired here was that of the Paul Arbor Co., on North Rockford street. L. O. Carlson is president of the company, H. W. Bole general superintendent and R. A. Newcombe will be superintendent of the branch plant here. Company manufactures meter-type gasoline pumps. (Noted March 12.)

Texas

BRYAN—Stevenson Machinery Co. is reported to plan reconstruction of its plant, recently virtually destroyed by fire with loss estimated at $45,000.

HOUSTON—Houston Foundry & Machine Co. has been incorporated with $300,000 capital by A. J. Binz, Binz building, to operate a steel foundry.

HOUSTON — Murphy Tool Co. has been incorporated with $5000 capital by F. W. Lawton, 2624 Oakdale street, to manufacture oil tools.

HOUSTON — Southwestern Can Co., H. O. Westwood president and general manager, has acquired a site, 180 x 350 feet, in the Neils Esperson industrial addition, for the erection of a new plant. (Noted Jan. 22.)

LUBBOCK—Magnolia Petroleum Co. has started construction of a pumphouse in connection with a warehouse and garage to be built here.

Wisconsin

MILWAUKEE — Wisconsin Art Bronze & Iron Co. has been organized by W. C. Schmeling, formerly assistant general manager of the Wisconsin Ornamental Iron & Bronze Co., division of General Bronze Corp. A new plant is being established at 247 East Keefe avenue and production will begin at once with a force of 40 men. Fred Van Kooy and A. R. Stark are associated in the enterprise.

PLYMOUTH—H. J. Rooney, chairman of building committee, board of education, has initiated a project for erection of a new high school to contain technical classroms and shops. Cost is estimated at $100,000 to $150,000.

North Dakota

KINCAID—Montana-Dakota Power Co. will erect additional power plant buildings here. Garland & Scribbins Inc., 38 South Dearborn street, Chicago, consulting engineer, will award contracts.

Iowa

SAC CITY—Iowa Railway & Light Co., Cedar Rapids, Iowa, plans to build a power station here at a cost of about $40,000. Company's engineering department is in charge.

Nebraska

NORTH PLATTE — Northwestern Public Service Co., Huron, S. D., proposes to build a power plant here. Cost is estimated at $500,000.

Arizona

GLOBE—City council is considering the purchase of auxiliary power equipment and pumping machinery. Estimated cost, $30,000.

WILLIAMS—City council proposes improvements to the waterworks system, including purchase of mechanical equipment. A. A. Weiland Engineering Co., Thatcher building, Pueblo, Colo., is engineer. Approximate cost, $175,000.

Pacific Coast

LONG BEACH, CALIF. — Southern California Edison Co., 306 West Third street, Los Angeles, has let contract to Stone & Webster, 510 Homer Laughlin building, Los Angeles, for the design and construction of a third unit of a steam power plant here, with 135,000 horsepower capacity. Boilers, pumps, generating and auxiliary equipment will be required. Cost is estimated at $7,500,000.

LOS ANGELES—Albatross Steel Furniture Co. Ltd., with plant in West Los Angeles, is reported to be enlarging its plant space. Expenditure will

be about $20,000. E. S. Gillette is president.

LOS ANGELES — Friedman-Zoeller Inc. has started production of ornamental iron products in a plant leased at 670 South Anderson street. Floor space amounts to 12,000 square feet.

PASADENA, CALIF. — Municipal light and power department is considering improvements, to include installation of a 25,000-kilowatt steam turbine unit.

SAN DIEGO, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids March 31 on schedule 5339 for one hardening furnace and equipment for delivery to the naval air tsation here.

BREMERTON, WASH.—Bureau of yards and docks, navy department, Washington, advises that power plant improvements at the Puget Sound navy yard here will include installation of pumping equipment. (Noted March 12.)

BREMERTON, WASH. — Bureau of yards and docks, navy department, Washington, has plans for a machine shop and other improvements at the Puget Sound navy yard near here. Estimated cost, $1,000,000.

SEATTLE — Minerals & Metals Corp. has been incorporated by A. E. Mills and associates, 3026 First avenue.

Dominion of Canada

VANCOUVER, B. C.—Ford Motor Co. of Canada Ltd., W. R. Campbell president, 1160 Hamilton street, proposes to build an assembly plant here or in this vicinity, at a cost of about $1,000,000.

ALFRED, ONT.—Industrial school will be built near here for Christian Brotherhood of Canada, Montreal, Que., at a cost of about $200,000. A. J. Hazelgrove, architect, Ottawa, Ont., will receive bids about April 1.

BRIDGEPORT, ONT.—Stewart Motor Corp., 93 Dewey avenue, Buffalo, is reported to have acquired a plant here for the assembly of trucks for the Canadian market.

LEASIDE, ONT.—Durant Motors of Canada, Roy Kerby president, with plant here, and Nash Motor Co., Charles W. Nash president, propose to organize a company to be known as Dominion Motors Ltd., to manufacture automobiles in Canada. Preliminary action toward manufacture has been started here. Kerby is to be president of the new company and Nash chairman of the board.

SMITHS FALLS, ONT.—Castings of Canada Ltd., whose incorporation recently was noted, advises through Fred C. Clayton, president and general manager, that the company's main office is located at 418 Sparks street, Ottawa, Ont., but that all mail should be addressed to this city, where a plant is being established. The No. 2 plant of Smiths Falls Malleable Castings Ltd. has been leased for the production of leakproof unions and other malleable cast iron products. (Noted March 12.)

TORONTO, ONT.—International Resistance Co., 2006 Chestnut street, Philadelphia, through a Canadian branch, has leased a plant at 74 Wellington street west and will begin operations at once.

TORONTO, ONT.—Munz Spralawn Co. Ltd. has been incorporated with $80,000 and 20,000 no par shares by James E. Ganong, attorney, 350 Bay street, to operate as manufacturer.

TORONTO, ONT.—Arthur S. Leitch Co. Ltd., 1123 Bay street, will increase facilities at its plant for the manufacture of products for the Canadian market, under reported arrangements with Sims Co., Erie, Pa., manufacturer of steam appliances, and the Yarnell Waring Co., Philadelphia.

WALKERVILLE, ONT. — Heating Appliance Corp. Ltd. has been incorporated with $80,000 capital by Benjamin Edelman, Windsor, Ont., to manufacture and deal in heating, refrigerating and cooling appliances.

MONTREAL, QUE. — Rockbestos Products Corp., 285 Nicoll street, New Haven, Conn., and Canadian interests are reported to be organizing a company with Lawford Grant, president and general manager of the E. F. Phillips Electrical Works Ltd., as president. Rockbestos company makes asbestos-covered wire and cable.

ST. HYACINTHE, QUE. — Hump Hair Pin Mfg. Co., 1918 Prairie avenue, Chicago, is reported to be considering construction of a plant on Ste. Anne street here. Estimated cost, $125,000.

New Trade Publications

FOUNDRY EQUIPMENT—W. W. Sly Mfg. Co., Cleveland, has issued a bulletin on its sandblast, tumbling mill and dust arrester equipment for foundries. It is illustrated.

CENTRIFUGAL PUMPS — Bulletin No. 164 has been issued by the Duriron Co., Dayton, O., on its No. 40 and self-priming No. 50 centrifugal pumps. Descriptions, rating charts and illustrations cover the pumps fully.

AIR-OPERATED CONTROLLER — Bristol Co., Waterbury, Conn., in catalog 4000, describes its air-operated controller equipment, including instrument, valve and accessories sections. Application of this equipment is described and charts and diagrams make plain the descriptions.

CHAIN PRODUCTS—A booklet by the American Chain Co. Inc., Bridgeport, Conn., and its associate companies which indicates the broad field of manufacturing activities in which this company and its associates are engaged. The group is known as the ACCO Industries.

TUNGSTEN CARBIDE—Firth-Sterling Steel Co., McKeesport, Pa., in a current booklet outlines the use and advantages of tungsten carbide in cutting tools, with much information relative to service and handling of the material. A standard tool list also has been prepared as a supplement to this booklet.

DAMPER REGULATORS — Atlas Valve Co., 282 South street, Newark, N. J., has issued a bulletin covering three types of damper regulators, for low pressure and vapor heating boilers, medium pressure power boilers and high pressure power plants. It is illustrated and data and prices are given. Diagrams show how the regulators are applied to the various types of boilers.

STEEL WAREHOUSE — McLennan, McFeely & Prior Ltd., Vancouver, B. C., has issued a special booklet on its new heavy goods warehouse, showing exterior and interior views and presenting a list of concerns represented by this firm. The company's facilities at Victoria and New Westminster, B. C., also are shown.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has issued a number of bulletins on various equipment, as follows: Fractional-horsepower direct current motors; thrustors; squirrel-cage induction motors; gluepots; resistor units; helicoil sheath-wire immersion heaters; vertical, hollow-shaft induction motors; direct-current motors.

BAFFLE WALL—Boiler Engineering Co., 24 Commerce street, Newark, N. J., has issued a bulletin on the Beco-Turner baffle wall for water-tube boilers. It is devoted to fuel economy possible by use of this adjunct to the boiler. Much engineering information on boiler baffle walls is given and illustrations show actual examples of such walls applied to all types of water-tube boilers, both horizontal and vertical.

BORING, DRILLING, MILLING MACHINE—Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has issued a catalog on its No. 45 high power precision horizontal boring, drilling and milling machine. Its illustrations present all the improvements recently incorporated in this machine. Detailed descriptions are given of the various parts, with phanton views of the feed unit, transmission, measuring unit and other parts.